GUIDE FOR THE SELECTION AND THE APPLICATION OF HELIX/HYDRO-QUÉBEC VIBRATION DAMPERS

SINGLE CONDUCTORS AND STEEL GROUND WIRES

AAHQ-1-01EN

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1. Introduction

This guide is intended to provide useful information in tabular form to evaluate the damping needs of single conductor and ground wire spans. Where the installation of vibration dampers is required, the information presented will allow the selection of the model, number and location of Helix/Hydro-Québec vibration dampers on single conductors and ground wires based on the conductor, the mechanical tension and the type of terrain. The maximum span lengths that can be protected are specified. The tables are limited to spans that can be protected by a maximum of two vibration dampers (i.e. one damper at each end).

2. Use of the guide

It is well known that stranded cables become more sensitive to wind vibrations when the mechanical tension increases. This is true whether or not they are protected by vibration dampers. In general, span damping using vibration dampers is inexpensive, and this is certainly preferable to a dangerous failure of a conductor due to fatigue. With the use of vibration dampers, higher tensions are possible, but it must be ensured that the span length is below a certain limit in order to avoid damage to the conductor in fatigue.

This guide is based mainly on the safety tensions recommended in the CIGRÉ [1-2] guides for single conductors. It applies to steel ground wires as well as to the following round stranded conductors:

- All Aluminium conductors (AAC);
- Aluminium-conductors steel-reinforced (ACSR).

For these conductors, the guide recommendations were verified and validated using specialized software to calculate the response of single conductors / cables to wind vibrations. In order to achieve this, the software has been applied to several conductors in the diameter range of 16 to 40 mm. For steel ground wires, only the software was used to produce the tables since this application is not covered in the CIGRÉ [1-2] guides. Verifications were done for several steel ground wires in the diameter range of 9 to 16 mm.

This software allows the evaluation of the vibration amplitudes at the anti-node of the cable for given wind conditions. It uses the most recent knowledge available in the literature [3-6] to first evaluate the wind-induced power and the dissipated power in cables and vibration dampers. The dynamic bending stresses are then calculated and compared to the fatigue endurance limits of each cable to evaluate the maximum span length that can be protected at different mechanical tension levels. In the case of conductors, the verifications were completed by an estimate of their useful life (likely at 95%) before fatigue.

To use this guide correctly, two fundamental parameters must first be evaluated:

- the mechanical tension of conductor / ground wire;
- the terrain category.

In the case of new lines, the mechanical tension to be used in this guide is the one that corresponds to the initial horizontal tension of the conductor at the average temperature of the coldest month on the site of the line, before any wind or ice overload and before creep. In the case of existing lines, the mechanical tension to be used in this guide is the one that corresponds to the current horizontal tension of the conductor at the average temperature of the coldest month on the site of the line, in the absence of any wind or ice overload.

This guide, along with the CIGRE [1-2] guides, uses four terrain categories to roughly define the wind turbulence associated with it. These four categories are shown in Table 1.

Table 1: Characteristics associated with terrain categories

Terrain category	Terrain characteristics
1	Open, flat, no trees, no obstruction, with snow cover, or near/across large bodies of water; flat desert.
2	Open, flat, no obstruction, no snow; *e.g.* farmland without any obstruction, summer time.
3	Open, flat, or undulating with very few obstacles, *e.g.* open grass or farmland with few trees, hedgerows and other barriers; prairie, tundra.
4	Built-up with some trees and buildings, *e.g.* residential suburbs; small towns; woodlands and shrubs. Small fields with bushes, trees and hedges.

In case of doubt concerning the terrain category, the lowest category must be chosen.

Table 2 shows some of the main characteristics of the Helix/Hydro-Québec vibration dampers presented in this guide. Each of these vibration dampers is characterized by two resonant frequencies.

Table 2: Main characteristics of Helix/Hydro-Québec vibration dampers

Model	Conductor diameter		Dimensions[1]		Bolt torque	Nominal total weight
	Min. (mm)	Max. (mm)	L (mm)	E (mm)	(N · m)	(kg)
87422	9.0	15.0	320	192	50	2.10
87423	15.0	20.0	320	192	50	2.10
85144	20.0	25.0	322	199	60	2.96
85222	9.0	15.0	322	192	50	3.28
85223	15.0	20.0	322	192	50	3.27
85244	20.0	25.0	322	199	60	3.41
85323	15.0	20.0	334	214	50	5.14
85344	20.0	25.0	344	221	60	5.10

Note 1 : The dimensions *L* et *E* refers to figure 1.

Table 2 : Main characteristics of Helix/Hydro-Québec vibration dampers (suite)

Model	Conductor diameter		Dimensions[1]		Bolt torque	Nominal total weight
	Min. (mm)	Max. (mm)	L (mm)	E (mm)	(N · m)	(kg)
85345	25.0	30.0	334	221	60	5.27
85366	30.0	35.0	344	226	60	5.44
85523	15.0	20.0	334	223	50	7.37
85544	20.0	25.0	344	230	60	7.52
85545	25.0	30.0	344	230	60	7.40
85566	30.0	35.0	344	235	60	7.64
85567	35.0	40.0	344	235	60	7.67
85580	50.0	55.0	344	256	60	7.69
85588	40.0	45.0	344	256	60	7.69
85589	45.0	50.0	344	256	60	7.69
85845	25.0	30.0	344	230	60	8.78
85866	30.0	35.0	344	235	60	9.02
85867	35.0	40.0	344	235	60	9.00
85888	40.0	45.0	344	256	60	9.04
85889	45.0	50.0	344	256	60	9.00
85880	50.0	55.0	344	256	60	9.00

Note 1 : The dimensions *L* et *E* refers to figure 1.

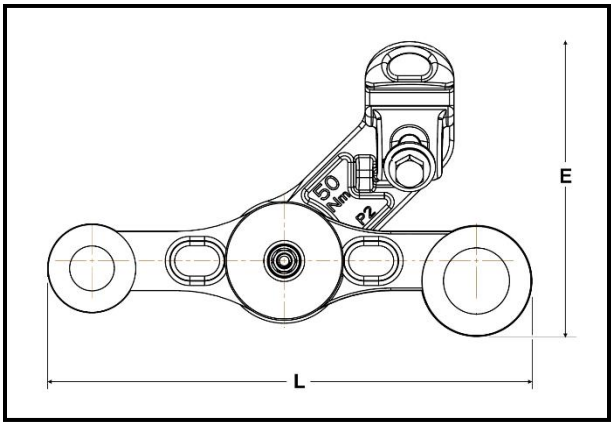

Figure 1 : Overall dimensions of Helix/Hydro-Québec vibration damper

Table I in the appendix shows the list of conductors that are covered by the guide. The main characteristics of these conductors are presented in this table. Table II shows the list of ground wires that are covered by the guide. Only ground wires above grade 160 were retained because their fatigue properties are well known [4] ("Extra-High Strength Galvanized Steel Ground Wire").

Table III shows, for each conductor in Table I, the recommended type of vibration damper, the position in meters of the vibration damper(s), the maximum span length (**L1**) which can be protected with a vibration damper per span and the maximum span length (**L2**) that can be protected with two

vibration dampers per span, one per end, depending on the mechanical tension level (10 to 29% RTS) and terrain category (1 to 4). The positions are defined as follows:

Pos_1: Position of the first damper
Pos_2: Position of the second damper at the opposite end of the span

The desired information is at the intersection of the column corresponding to the given mechanical tension level and the row corresponding to the given terrain category. The tension parameter (**H/w**) in meters, expressing the ratio of the horizontal mechanical tension component (**H**) to the linear weight of the conductor (**w**), appears under the given tension values in % of the rated tensile strength (% RTS). The characteristics of the conductor (name, diameter, linear weight, rated tensile strength and construction) appear in the header of each of the respective sub-tables.

Table IV presents the same information for each of the ground wires in Table II.
Table V is included in the Excel file <AAHQ-1-01EN.xls>. In this electronic file, Table V makes it possible to automatically calculate **L1** and **L2** values for conductors not listed in Table I.

3. Maximum span length and vibration damper position

In Table III, the recommended position, **Pos_1**, of the damper represents the distance in meters between the middle of the damper clamp and the end of the suspension clamp or anchor sleeve. In cases requiring two vibration dampers per span, one per end, the position of the second vibration damper, **Pos_2**, corresponds roughly to a distance of 90% of the first one, in order to avoid the two vibration dampers to be at the same time at a vibration node.

The span length **L1**, in meters, represents the maximum span length that can be protected with only **1** damper per span, without exceeding the span **L1 = 7.5m / D** meters, where **D** is the conductor diameter in meters and **m** is its linear weight in kg/m, i.e. half of the plateau identified in the CIGRÉ guide [2]. Furthermore, as an additional cautionary measure, the absolute value of the span lengths is limited to **L1 = 300** m for terrain category 1, **L1 = 400** m for terrain category 2, **L1 = 500** m for terrain category 3 and **L1 = 600** m for terrain category 4. The maximum span length **L2** that can be protected with two vibration dampers per span, one at each end of the span, is simply to double **L1** up to **L2 = 800** m.

When the "--" symbol appears in the table, it means that no vibration damper is required. The "++" symbol means that the tension level is too high for a damping system to be determined using this guide. A special study is then necessary, and as mentioned in section 1, and Helix's technical support must be consulted.

The same remarks apply to Tables IV and V.

When armor rods are used in the suspension clamps and they prevent the positioning of the vibration damper as indicated in the guide, it must be installed about 50 mm from the end of the armor rods, IF the resulting distance from the end of the suspension clamp is within 150% of Pos_1 and Pos_2 values. Where this is not possible, a special study is required.

Positions **Pos_1** and **Pos_2** of the vibration dampers are defined in the following figure:

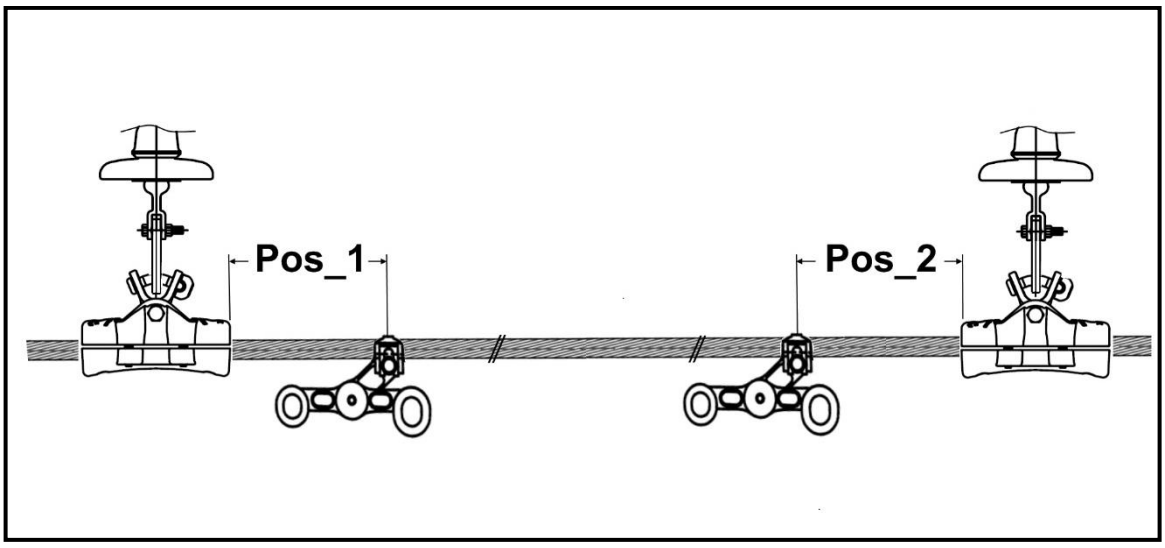

Figure 2 : Pos_1 and Pos_2 positions definition

It is recommended to install the vibration dampers in a way that the clamping bolt is oriented towards the middle of the tower to facilitate the maintenance. In addition, the dampers must be positioned vertically with a tolerance of ± 10°. In the case of a dead-end span to be equipped with a single damper, it is recommended to install the damper on the side of the suspension clamp. Please refer to the damper installation instructions for step by step installation procedure and positioning tolerances.

4. Cautionary notes

The recommendations in this guide apply exclusively to Helix/Hydro-Québec vibration dampers. They apply to normal situations defined by conventional AAC or ACSR conductors with round strands or steel ground wires with a grade above 160, that are suspended or supported by conventional metal-metal clamps, with or without armor rods. A special study is required in the following cases:

- Armor rods prevent the vibration dampers to be install in a range of one to one and a half times the recommended **Pos_1/Pos_2** position;
- Non-conventional suspension or dead-end devices are used;
- Conductors including aluminum alloy strands (AAAC or ACAR) are used;
- Spans have considerable attachment height differences;
- Non-conventional conductors such as compact conductors (AAC/TW, ACSR/TW or AAAC/TW) or high-temperature conductors are used;
- Optical ground wires (OPGW) are used.

In addition, caution should be taken in the design of the damping system if conductors and ground wires are used on long river or lake crossings, if they are often covered with frost, ice or wet snow or if they are subject to galloping.

5. Examples

a) ACSR Drake conductor

Initial data :
Initial mechanical tension at the average temperature of the coldest month: 35.0 kN.
Terrain category #1.
Initial tension expressed in % RTS : 25.2% RTS rounded to 25% RTS.

Using the table III, we find:

Conductor	ACSR Drake	AWG/kcmil :	795	D =	28.1	mm	w =	1.632	kg/m	RTS =	139.0	kN	Const. : 26/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.8	33.4	32.0	30.6	29.2	27.8	26.4	25.0	23.6	22.2	20.9	19.5	18.1	16.7	15.3	13.9
	H/w (m)	2518	2431	2344	2257	2171	2084	1997	1910	1823	1736	1650	1563	1476	1389	1302	1215	1129	1042	955	868
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
Terrain 1	L1 (m)	++	++	75	100	125	200	275	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	150	200	300	400	400	400	400	400	400	400	400	400	400	400	--	--	--
Terrain 3	L1 (m)	75	125	150	225	300	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--
Terrain 4	L1 (m)	150	200	250	350	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--

Conductor	ACSR Drake	AWG/kcmil :	795	D =	28.1	mm	w =	1.632	kg/m	RTS =	139.0	kN	Const. : 26/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.8	33.4	32.0	30.6	29.2	27.8	26.4	25.0	23.6	22.2	20.9	19.5	18.1	16.7	15.3	13.9
	H/w (m)	2518	2431	2344	2257	2171	2084	1997	1910	1823	1736	1650	1563	1476	1389	1302	1215	1129	1042	955	868
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
	Pos_2 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
Terrain 1	L2 (m)	++	++	150	200	275	375	550	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	125	150	225	300	425	575	800	800	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 3	L2 (m)	175	225	300	425	600	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	275	375	525	725	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

- Vibration damper type: 85545;
- 1st vibration damper position: 1.50 m from the end of the suspension clamp;
- Maximum span length that can be protected by a vibration damper: L1 = 125 m;
- 2nd vibration damper position: 1.35 m from the end of the other suspension clamp;
- Maximum span length with two vibration dampers: L2 = 275 m;

Therefore, all spans length less than 125 m in category # 1 must be equipped with a vibration damper and spans between 125 m and 275 m must be equipped with two vibration dampers, one per end. For spans longer than 275 m, special study is required.

b) ACSR Gatineau conductor

Conductor diameter: 33.0 mm;
Conductor linear weight: 2.042 kg/m;
RTS : 156 kN.
Since this conductor is not included in Tables I and III, the Excel file <AAHQ-1-01.xls> is needed to establish Table V.

Initial data:
Initial mechanical tension at the average temperature of the coldest month: 41.7 kN.
Terrain category #3.
Initial tension of Gatineau conductor expressed in %RTS: 26.7% RTS rounded to 27% RTS.

Using the table V, we find:

Conductor	ACSR Gatineau	AWG/kcmil :				D =	33.0	mm		w =	2.042	kg/m		RTS =	156.0	kN				Vibration damper :	85866	
1 vibration damper / span																						
	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	45.2	43.7	42.1	40.6	39.0	37.4	35.9	34.3	32.8	31.2	29.6	28.1	26.5	25.0	23.4	21.8	20.3	18.7	17.2	15.6
	H/w (m)	2258	2181	2103	2025	1947	1869	1791	1713	1635	1558	1480	1402	1324	1246	1168	1090	1012	935	857	779
	Pos_1 (m)	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.05
Terrain 1	L1 (m)	100	150	200	250	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	150	225	300	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 3	L1 (m)	225	300	425	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--
Terrain 4	L1 (m)	375	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--	--

Conducteur	ACSR Gatineau	AWG/kcmil :				D =	33.0	mm		w =	2.042	kg/m		RTS =	156.0	kN				Vibration damper :	85866	
2 vibration dampers / span																						
	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	45.2	43.7	42.1	40.6	39.0	37.4	35.9	34.3	32.8	31.2	29.6	28.1	26.5	25.0	23.4	21.8	20.3	18.7	17.2	15.6
	H/w (m)	2258	2181	2103	2025	1947	1869	1791	1713	1635	1558	1480	1402	1324	1246	1168	1090	1012	935	857	779
	Pos_1 (m)	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.05
	Pos_2 (m)	1.60	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
Terrain 1	L2 (m)	200	275	375	525	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	325	425	575	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 3	L2 (m)	450	600	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 4	L2 (m)	775	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--

- Vibration damper type : 85866;
- 1st vibration damper position: 1.75 m from the end of the suspension clamp;
- Maximum span length that can be protected by a vibration damper: L1 = 425 m;
- 2nd vibration damper position: 1.55 m from the end of the other suspension clamp;
- Maximum span length with two vibration dampers: L2 = 800 m;

Therefore, the maximum span length that can be protected with a vibration damper per span is 425 m. Using two vibration dampers per span, one at each end, the maximum span length that can be protected is 800 m.

c) Ground wire 5/8" grade 180

Initial data:
Initial mechanical tension at the average temperature of the coldest month: 42.9 kN.
Terrain category #2.
Initial tension expressed in % RTS: 23.97% RTS rounded to 24% RTS.

Using the table IV, we find:

Ground wire	Steel 5/8" grade 180					D =	15.8	mm		w =	1.210	kg/m		RTS =	179.0	kN				Vibration damper :		85523	
1 vibration damper / span																							
	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**51.9**	**50.1**	**48.3**	**46.5**	**44.8**	**43.0**	**41.2**	**39.4**	**37.6**	**35.8**	**34.0**	**32.2**	**30.4**	**28.6**	**26.9**	**25.1**	**23.3**	**21.5**	**19.7**	**17.9**
	H/w (m)	4373	4222	4072	3921	3770	3619	3468	3318	3167	3016	2865	2714	2564	2413	2262	2111	1960	1810	1659	1508
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Terrain 1	**L1 (m)**	++	++	++	++	++	++	++	++	++	++	++	75	125	250	300	300	300	300	--	--
Terrain 2	**L1 (m)**	++	++	++	++	++	++	++	++	++	75	125	250	400	400	400	400	--	--	--	--
Terrain 3	**L1 (m)**	++	++	++	++	++	++	++	75	125	250	475	500	500	500	--	--	--	--	--	--
Terrain 4	**L1 (m)**	++	++	++	++	++	75	150	300	575	575	575	575	--	--	--	--	--	--	--	--

Ground wire	Steel 5/8" grade 180					D =	15.8	mm		w =	1.210	kg/m		RTS =	179.0	kN				Vibration damper :		85523	
2 vibration dampers / span																							
	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**51.9**	**50.1**	**48.3**	**46.5**	**44.8**	**43.0**	**41.2**	**39.4**	**37.6**	**35.8**	**34.0**	**32.2**	**30.4**	**28.6**	**26.9**	**25.1**	**23.3**	**21.5**	**19.7**	**17.9**
	H/w (m)	4373	4222	4072	3921	3770	3619	3468	3318	3167	3016	2865	2714	2564	2413	2262	2111	1960	1810	1659	1508
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
	Pos_2 (m)	1.10	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70	0.65	0.65
Terrain 1	**L2 (m)**	++	++	++	++	++	++	++	++	++	++	75	150	275	500	600	600	600	600	--	--
Terrain 2	**L2 (m)**	++	++	++	++	++	++	++	++	++	75	150	275	500	800	800	800	800	--	--	--
Terrain 3	**L2 (m)**	++	++	++	++	++	++	75	150	250	500	800	800	800	800	--	--	--	--	--	--
Terrain 4	**L2 (m)**	++	++	++	++	100	175	325	600	800	800	800	800	--	--	--	--	--	--	--	--

- Vibration damper type: 85523;
- 1st vibration damper position: 1.10 m from the end of the suspension clamp;
- L1 = L2 = ++;

Therefore, at this tension level, it isn't possible to determine a damping system using the guide. It is necessary to have a particular study.

d) ACSR Partridge conductor

Initial data:
Actual mechanical tension at the average temperature of the coldest month: 12.9 kN.
Terrain category #3.
Actual tension expressed in % RTS: 25.8% RTS rounded to 26% RTS.

Using the table III, we find:

Conductor	ACSR Partridge	AWG/kcmil :	267	D =	16.3	mm	w =	0.545	kg/m	RTS =	50.0	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	14.5	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0
	H/w (m)	2712	2619	2525	2432	2338	2244	2151	2057	1964	1870	1777	1683	1590	1496	1403	1309	1216	1122	1029	935
	Pos_1 (m)	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.55
Terrain 1	L1 (m)	++	++	++	++	++	++	75	125	175	250	250	250	250	250	250	250	250	250	250	--
Terrain 2	L1 (m)	++	++	++	++	75	100	125	200	250	250	250	250	250	250	250	250	250	--	--	--
Terrain 3	L1 (m)	++	++	++	75	100	125	175	250	250	250	250	250	250	250	250	250	--	--	--	--
Terrain 4	L1 (m)	++	++	75	100	150	225	250	250	250	250	250	250	250	250	--	--	--	--	--	--

Conductor	ACSR Partridge	AWG/kcmil :	267	D =	16.3	mm	w =	0.545	kg/m	RTS =	50.0	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	14.5	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0
	H/w (m)	2712	2619	2525	2432	2338	2244	2151	2057	1964	1870	1777	1683	1590	1496	1403	1309	1216	1122	1029	935
	Pos_1 (m)	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.55
	Pos_2 (m)	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50
Terrain 1	L2 (m)	++	++	++	++	++	++	125	175	250	350	500	500	500	500	500	500	500	500	500	--
Terrain 2	L2 (m)	++	++	++	++	++	125	175	250	375	500	500	500	500	500	500	500	500	--	--	--
Terrain 3	L2 (m)	++	++	++	125	175	250	375	500	500	500	500	500	500	500	500	500	--	--	--	--
Terrain 4	L2 (m)	++	125	150	225	300	425	500	500	500	500	500	500	500	500	--	--	--	--	--	--

- Vibration damper type: 85323 ;
- 1st vibration damper position: 0.90 m from the end of the suspension clamp;
- Maximum span length that can be protected by 1 vibration damper: L1 = 75 m;
- 2nd vibration damper position: 0.85 m from the end of the other suspension clamp;
- Maximum span length with 2 vibrations dampers: L2 = 125 m;

Therefore, all spans length less than 75 m in category # 3 must be equipped with a vibration damper and the spans length between 75 m and 125 m must be equipped with two vibration dampers, one per end. For spans longer than 125 m, a special study is required.

e) ACSR Ostrich conductor

Initial data:
Initial mechanical tension at the average temperature of the coldest month: 6.6 kN.
Terrain category #2.
Initial tension expressed in % RTS: 11.7% RTS rounded to 12% RTS.

Using the table III, we find:

Conductor	ACSR Ostrich	AWG/kcmil :	300	D =	17.3	mm	w =	0.612	kg/m	RTS =	56.2	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	16.3	15.7	15.2	14.6	14.1	13.5	12.9	12.4	11.8	11.2	10.7	10.1	9.6	9.0	8.4	7.9	7.3	6.7	6.2	5.6
	H/w (m)	2715	2621	2527	2434	2340	2247	2153	2059	1966	1872	1779	1685	1591	1498	1404	1311	1217	1123	1030	936
	Pos_1 (m)	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60
Terrain 1	L1 (m)	++	++	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	275	--
Terrain 2	L1 (m)	++	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	--	--	--
Terrain 3	L1 (m)	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	--	--	--	--
Terrain 4	L1 (m)	++	++	75	125	150	225	275	275	275	275	275	275	275	275	--	--	--	--	--	--

Conductor	ACSR Ostrich	AWG/kcmil :	300	D =	17.3	mm	w =	0.612	kg/m	RTS =	56.2	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	16.3	15.7	15.2	14.6	14.1	13.5	12.9	12.4	11.8	11.2	10.7	10.1	9.6	9.0	8.4	7.9	7.3	6.7	6.2	5.6
	H/w (m)	2715	2621	2527	2434	2340	2247	2153	2059	1966	1872	1779	1685	1591	1498	1404	1311	1217	1123	1030	936
	Pos_1 (m)	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60
	Pos_2 (m)	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
Terrain 1	L2 (m)	++	++	++	++	++	125	175	250	375	525	525	525	525	525	525	525	525	525	525	--
Terrain 2	L2 (m)	++	++	++	++	125	200	275	400	525	525	525	525	525	525	525	525	525	--	--	--
Terrain 3	L2 (m)	++	++	++	150	200	275	400	525	525	525	525	525	525	525	525	525	--	--	--	--
Terrain 4	L2 (m)	++	125	175	225	325	450	525	525	525	525	525	525	525	525	--	--	--	--	--	--

- Vibration damper type: 85323;
- 1st vibration damper position: 0.65 m from the end of the suspension clamp;
- L1 = L2 = --;

Therefore, at this tension level with terrain category 2, no vibration damper is required.

6. References

[1] CIGRÉ Task Group 22.11.04, "*Safe design tension with respect to aeolian vibrations. Part 1: Single unprotected conductors*", Electra No. 186, October 1999.

[2] CIGRÉ Task Force 22.11.04, "*Safe design tension with respect to aeolian vibrations. Part 2: Damped single conductors*", Electra No. 198, October 2001.

[3] C. Hardy, D.U. Noiseux, A. Leblond, J. Brunelle, P. Van Dyke, "Modelling of Single Conductor-Damper System Response – Volume I : Theoretical and Validation Manual," Canadian Electricity Association, Report No. 372 T 823, July 1996.

[4] Transmission Line Reference Book, "*Wind-Induced Conductor Motion*", Electric Power Research Institute, Palo Alto, CA, 1979.

[5] Noiseux, D.U., "Similarity Laws of the Internal Damping of Stranded Cables in Transverse Vibrations," Proc. of the 1991 IEEE PES, T&D Conf., Dallas, Sept. 1991.

[6] Leblond, A et Hardy, C., "*Extended Similarity Laws of Self-Damping for Multilayered Stranded Cables in Transverse Vibrations*", 16ième Congrès Canadien de Mécanique appliquée, Laval University, Québec, June 1997, pp.155-156.

7. Annexes

Appendix 1: Table I – List of conductors

Appendix 2: Table II – List of ground wires

Appendix 3: Table III – Application guide for listed conductors

Appendix 4: Table IV – Application guide for listed ground wires

APPENDIX 1

TABLE 1 – LIST OF CONDUCTORS

TABLE I : LIST OF CONDUCTORS

Name	AWG/kcmil	Type	Stranding	Diameter (mm)	Weight (kg/m)	RTS (kN)	Page (table III)
Partridge	267	ACSR	26/7	16.30	0.545	50.0	1
Phoebe	300	ACSR	18/1	16.40	0.484	35.5	1
Ostrich	300	ACSR	26/7	17.27	0.612	56.2	2
Piper	300	ACSR	30/7	17.78	0.697	68.6	2
Merlin	336	ACSR	18/1	17.36	0.543	39.8	3
Linnet	336	ACSR	26/7	18.29	0.687	62.5	3
Oriole	336	ACSR	30/7	18.83	0.781	75.8	4
Chickadee	398	ACSR	18/1	18.87	0.642	46.4	4
Ibis	398	ACSR	26/7	19.88	0.811	72.0	5
Lark	398	ACSR	30/7	20.46	0.923	88.9	5
Pelican	477	ACSR	18/1	20.68	0.770	54.8	6
Toucan	477	ACSR	22/7	21.19	0.851	68.6	6
Hawk	477	ACSR	26/7	21.78	0.974	86.4	7
Hen	477	ACSR	30/7	22.42	1.108	104.0	7
Heron	500	ACSR	30/7	22.95	1.161	109.0	8
Shelter Bay	504	ACSR	22/7	21.79	0.900	71.7	8
Sapsucker	557	ACSR	22/7	22.88	0.993	79.1	9
Dove	557	ACSR	26/7	23.54	1.137	99.9	9
Eagle	557	ACSR	30/7	24.22	1.292	121.0	10
	605	ACSR	22/7	23.86	1.080	85.0	10
Duck	605	ACSR	54/7	24.19	1.157	100.0	11
Peace River	628	ACSR	48/7	24.13	1.091	88.3	11
Goldfinch	636	ACSR	22/7	24.47	1.135	89.3	12
Goose	636	ACSR	54/7	24.80	1.217	105.0	12
Grosbeak	636	ACSR	26/7	25.16	1.299	111.0	13
Egret	636	ACSR	30/19	25.89	1.466	141.0	13
	667	ACSR	42/7	24.54	1.068	78.6	14
Gull	667	ACSR	54/7	25.40	1.275	109.0	14
	716	ACSR	42/7	25.41	1.147	84.3	15
Crow	716	ACSR	54/7	26.31	1.369	117.0	15
Starling	716	ACSR	26/7	26.69	1.461	125.0	16
Redwing	716	ACSR	30/19	27.45	1.648	154.0	16
Macaw	795	ACSR	42/7	26.79	1.274	93.7	17
Condor	795	ACSR	54/7	27.73	1.521	127.0	17
Drake	795	ACSR	26/7	28.13	1.632	139.0	18
Mallard	795	ACSR	30/19	28.95	1.832	171.0	18

TABLE I : LIST OF CONDUCTORS

Name	AWG/kcmil	Type	Stranding	Diameter (mm)	Weight (kg/m)	RTS (kN)	Page (table III)
Les Boules	865	ACSR	42/7	27.94	1.386	100.0	19
	875	ACSR	42/7	28.10	1.402	102.0	19
Crane	875	ACSR	54/7	29.10	1.674	140.0	20
	900	ACSR	42/7	28.51	1.442	105.0	20
Canary	900	ACSR	54/7	29.51	1.722	144.0	21
Phoenix	954	ACSR	42/7	29.34	1.529	109.0	21
Cardinal	954	ACSR	54/7	30.38	1.825	152.0	22
Carillon	1030	ACSR	42/7	30.48	1.648	118.0	22
Snowbird	1034	ACSR	42/7	30.56	1.657	118.0	23
Curlew	1034	ACSR	54/7	31.62	1.977	165.0	23
Beaumont	1113	ACSR	42/7	31.70	1.784	126.0	24
Finch	1113	ACSR	54/19	32.83	2.119	179.0	24
	1193	ACSR	42/7	32.81	1.911	135.0	25
Grackle	1193	ACSR	54/19	33.98	2.270	192.0	25
Scissortail	1272	ACSR	42/7	33.89	2.039	144.0	26
Pheasant	1272	ACSR	54/19	35.09	2.421	200.0	26
	1352	ACSR	42/7	34.94	2.166	153.0	27
Martin	1352	ACSR	54/19	36.16	2.572	212.0	27
Bersimis	1361	ACSR	42/7	35.01	2.181	154.0	28
Bersfort	1361	ACSR	48/7	35.56	2.369	180.0	28
	1431	ACSR	42/7	35.95	2.294	162.0	29
Plover	1431	ACSR	54/19	37.22	2.724	225.0	29
	1511	ACSR	42/7	36.92	2.421	171.0	30
Parrot	1511	ACSR	54/19	38.22	2.874	237.0	30
	1570	ACSR	72/7	37.75	2.499	176.0	31
	1570	ACSR	48/7	38.53	2.780	212.0	31
Falcon	1570	ACSR	54/19	39.23	3.027	250.0	32

APPENDIX 2

TABLE II – LIST OF GROUND WIRES

TABLE II : LIST OF GROUND WIRES

Name	Designation	Grade	Diameter (mm)	Weight (kg/m)	RTS (kN)	Page (table IV)
Steel ground wire 3/8" gr. 160	CDG09BF	gr160	9.1	0.402	53.4	1
Steel ground wire 3/8" gr. 180	CDG09CF	gr180	9.1	0.402	60.0	1
Steel ground wire 7/16" gr. 160	CDG11BF	gr160	11.0	0.577	76.9	2
Steel ground wire 7/16" gr. 180	CDG11CF	gr180	11.0	0.577	86.7	2
Steel ground wire 1/2" gr. 160	CDG12BF	gr160	12.7	0.759	101.0	3
Steel ground wire 1/2" gr. 180	CDG12CF	gr180	12.7	0.759	113.6	3
Steel ground wire 1/2" gr. 220	CDG12DF	gr220	12.7	0.759	138.8	4
Steel ground wire 5/8" gr. 160	CDG15BF	gr160	15.8	1.210	159.7	4
Steel ground wire 5/8" gr. 180	CDG15CF	gr180	15.8	1.210	179.0	5

APPENDIX 3

TABLE III – APPLICATION GUIDE FOR LISTED CONDUCTORS

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APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Partridge	AWG/kcmil :	267	D =	16.30	mm	w =	0.545	kg/m	RTS =	50.0	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	14.5	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0
	H/w (m)	2712	2619	2525	2432	2338	2244	2151	2057	1964	1870	1777	1683	1590	1496	1403	1309	1216	1122	1029	935
	Pos_1 (m)	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.55
Terrain 1	L1 (m)	++	++	++	++	++	++	75	125	175	250	250	250	250	250	250	250	250	250	250	--
Terrain 2	L1 (m)	++	++	++	++	75	100	125	200	250	250	250	250	250	250	250	250	250	--	--	--
Terrain 3	L1 (m)	++	++	++	75	100	125	175	250	250	250	250	250	250	250	250	250	--	--	--	--
Terrain 4	L1 (m)	++	++	75	100	150	225	250	250	250	250	250	250	250	250	--	--	--	--	--	--

Conductor	ACSR Partridge	AWG/kcmil :	267	D =	16.30	mm	w =	0.545	kg/m	RTS =	50.0	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	14.5	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0
	H/w (m)	2712	2619	2525	2432	2338	2244	2151	2057	1964	1870	1777	1683	1590	1496	1403	1309	1216	1122	1029	935
	Pos_1 (m)	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.55
	Pos_2 (m)	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50
Terrain 1	L2 (m)	++	++	++	++	++	125	175	250	350	500	500	500	500	500	500	500	500	500	500	--
Terrain 2	L2 (m)	++	++	++	++	125	175	250	375	500	500	500	500	500	500	500	500	500	--	--	--
Terrain 3	L2 (m)	++	++	++	125	175	250	375	500	500	500	500	500	500	500	500	500	--	--	--	--
Terrain 4	L2 (m)	++	125	150	225	300	425	500	500	500	500	500	500	500	500	--	--	--	--	--	--

Conductor	ACSR Phoebe	AWG/kcmil :	300	D =	16.40	mm	w =	0.484	kg/m	RTS =	35.5	kN	Const. : 18/1	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	10.3	9.9	9.6	9.2	8.9	8.5	8.2	7.8	7.5	7.1	6.7	6.4	6.0	5.7	5.3	5.0	4.6	4.3	3.9	3.6
	H/w (m)	2168	2093	2019	1944	1869	1794	1720	1645	1570	1495	1421	1346	1271	1196	1122	1047	972	897	822	748
	Pos_1 (m)	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50
Terrain 1	L1 (m)	75	100	125	175	225	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--
Terrain 2	L1 (m)	100	150	200	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--
Terrain 3	L1 (m)	150	200	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--	--
Terrain 4	L1 (m)	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Phoebe	AWG/kcmil :	300	D =	16.40	mm	w =	0.484	kg/m	RTS =	35.5	kN	Const. : 18/1	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	10.3	9.9	9.6	9.2	8.9	8.5	8.2	7.8	7.5	7.1	6.7	6.4	6.0	5.7	5.3	5.0	4.6	4.3	3.9	3.6
	H/w (m)	2168	2093	2019	1944	1869	1794	1720	1645	1570	1495	1421	1346	1271	1196	1122	1047	972	897	822	748
	Pos_1 (m)	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50
	Pos_2 (m)	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.45
Terrain 1	L2 (m)	150	200	250	350	450	450	450	450	450	450	450	450	450	450	450	450	--	--	--	--
Terrain 2	L2 (m)	225	275	400	450	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--
Terrain 3	L2 (m)	300	400	450	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--
Terrain 4	L2 (m)	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Ostrich	AWG/kcmil :	300	D =	17.27	mm	w =	0.612	kg/m	RTS =	56.2	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	16.3	15.7	15.2	14.6	14.1	13.5	12.9	12.4	11.8	11.2	10.7	10.1	9.6	9.0	8.4	7.9	7.3	6.7	6.2	5.6
	H/w (m)	2715	2621	2527	2434	2340	2247	2153	2059	1966	1872	1779	1685	1591	1498	1404	1311	1217	1123	1030	936
	Pos_1 (m)	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60
Terrain 1	L1 (m)	++	++	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	275	--
Terrain 2	L1 (m)	++	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	--	--	--
Terrain 3	L1 (m)	++	++	++	75	100	125	200	275	275	275	275	275	275	275	275	275	--	--	--	--
Terrain 4	L1 (m)	++	++	75	125	150	225	275	275	275	275	275	275	275	275	--	--	--	--	--	--

Conductor	ACSR Ostrich	AWG/kcmil :	300	D =	17.27	mm	w =	0.612	kg/m	RTS =	56.2	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	16.3	15.7	15.2	14.6	14.1	13.5	12.9	12.4	11.8	11.2	10.7	10.1	9.6	9.0	8.4	7.9	7.3	6.7	6.2	5.6
	H/w (m)	2715	2621	2527	2434	2340	2247	2153	2059	1966	1872	1779	1685	1591	1498	1404	1311	1217	1123	1030	936
	Pos_1 (m)	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60
	Pos_2 (m)	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
Terrain 1	L2 (m)	++	++	++	++	++	125	175	250	375	525	525	525	525	525	525	525	525	525	525	--
Terrain 2	L2 (m)	++	++	++	++	125	200	275	400	525	525	525	525	525	525	525	525	525	--	--	--
Terrain 3	L2 (m)	++	++	++	150	200	275	400	525	525	525	525	525	525	525	525	525	--	--	--	--
Terrain 4	L2 (m)	++	125	175	225	325	450	525	525	525	525	525	525	525	525	--	--	--	--	--	--

Conductor	ACSR Piper	AWG/kcmil :	300	D =	17.78	mm	w =	0.697	kg/m	RTS =	68.6	kN	Const. : 30/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	19.9	19.2	18.5	17.8	17.2	16.5	15.8	15.1	14.4	13.7	13.0	12.3	11.7	11.0	10.3	9.6	8.9	8.2	7.5	6.9
	H/w (m)	2910	2809	2709	2609	2508	2408	2308	2207	2107	2007	1906	1806	1706	1605	1505	1405	1304	1204	1104	1003
	Pos_1 (m)	1.10	1.10	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65
Terrain 1	L1 (m)	++	++	++	++	++	++	++	75	125	175	275	300	300	300	300	300	300	300	300	300
Terrain 2	L1 (m)	++	++	++	++	++	++	75	125	175	275	300	300	300	300	300	300	300	300	--	--
Terrain 3	L1 (m)	++	++	++	++	++	75	125	175	250	300	300	300	300	300	300	300	300	--	--	--
Terrain 4	L1 (m)	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	--	--	--	--	--

Conductor	ACSR Piper	AWG/kcmil :	300	D =	17.78	mm	w =	0.697	kg/m	RTS =	68.6	kN	Const. : 30/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	19.9	19.2	18.5	17.8	17.2	16.5	15.8	15.1	14.4	13.7	13.0	12.3	11.7	11.0	10.3	9.6	8.9	8.2	7.5	6.9
	H/w (m)	2910	2809	2709	2609	2508	2408	2308	2207	2107	2007	1906	1806	1706	1605	1505	1405	1304	1204	1104	1003
	Pos_1 (m)	1.10	1.10	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65
	Pos_2 (m)	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60
Terrain 1	L2 (m)	++	++	++	++	++	++	++	150	225	350	550	600	600	600	600	600	600	600	600	600
Terrain 2	L2 (m)	++	++	++	++	++	125	175	250	350	550	600	600	600	600	600	600	600	600	--	--
Terrain 3	L2 (m)	++	++	++	++	125	175	250	350	525	600	600	600	600	600	600	600	600	--	--	--
Terrain 4	L2 (m)	++	++	++	150	200	275	400	600	600	600	600	600	600	600	600	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Merlin	AWG/kcmil :	336	D =	17.36	mm	w =	0.543	kg/m	RTS =	39.8	kN	Const. : 18/1	Vibration damper :	85323

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**11.5**	**11.1**	**10.7**	**10.3**	**10.0**	**9.6**	**9.2**	**8.8**	**8.4**	**8.0**	**7.6**	**7.2**	**6.8**	**6.4**	**6.0**	**5.6**	**5.2**	**4.8**	**4.4**	**4.0**
	H/w (m)	2167	2092	2017	1943	1868	1793	1718	1644	1569	1494	1420	1345	1270	1195	1121	1046	971	897	822	747
	Pos_1 (m)	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
Terrain 1	**L1 (m)**	75	100	125	175	225	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--
Terrain 2	**L1 (m)**	125	150	200	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--
Terrain 3	**L1 (m)**	175	225	225	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--	--
Terrain 4	**L1 (m)**	225	225	225	225	225	225	225	225	225	225	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Merlin	AWG/kcmil :	336	D =	17.36	mm	w =	0.543	kg/m	RTS =	39.8	kN	Const. : 18/1	Vibration damper :	85323

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**11.5**	**11.1**	**10.7**	**10.3**	**10.0**	**9.6**	**9.2**	**8.8**	**8.4**	**8.0**	**7.6**	**7.2**	**6.8**	**6.4**	**6.0**	**5.6**	**5.2**	**4.8**	**4.4**	**4.0**
	H/w (m)	2167	2092	2017	1943	1868	1793	1718	1644	1569	1494	1420	1345	1270	1195	1121	1046	971	897	822	747
	Pos_1 (m)	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
	Pos_2 (m)	0.85	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.60	0.60	0.60	0.55	0.55	0.50	0.50
Terrain 1	**L2 (m)**	150	200	275	375	475	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--
Terrain 2	**L2 (m)**	225	300	425	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--
Terrain 3	**L2 (m)**	325	450	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--
Terrain 4	**L2 (m)**	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Linnet	AWG/kcmil :	336	D =	18.29	mm	w =	0.687	kg/m	RTS =	62.5	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**18.1**	**17.5**	**16.9**	**16.3**	**15.6**	**15.0**	**14.4**	**13.8**	**13.1**	**12.5**	**11.9**	**11.3**	**10.6**	**10.0**	**9.4**	**8.8**	**8.1**	**7.5**	**6.9**	**6.3**
	H/w (m)	2689	2597	2504	2411	2318	2226	2133	2040	1947	1855	1762	1669	1577	1484	1391	1298	1206	1113	1020	927
	Pos_1 (m)	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65	0.65
Terrain 1	**L1 (m)**	++	++	++	++	++	75	100	150	225	275	275	275	275	275	275	275	275	275	275	--
Terrain 2	**L1 (m)**	++	++	++	++	75	100	150	225	275	275	275	275	275	275	275	275	275	--	--	--
Terrain 3	**L1 (m)**	++	++	++	75	100	150	225	275	275	275	275	275	275	275	275	275	--	--	--	--
Terrain 4	**L1 (m)**	++	75	100	125	175	275	275	275	275	275	275	275	275	275	--	--	--	--	--	--

Conductor	ACSR Linnet	AWG/kcmil :	336	D =	18.29	mm	w =	0.687	kg/m	RTS =	62.5	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**18.1**	**17.5**	**16.9**	**16.3**	**15.6**	**15.0**	**14.4**	**13.8**	**13.1**	**12.5**	**11.9**	**11.3**	**10.6**	**10.0**	**9.4**	**8.8**	**8.1**	**7.5**	**6.9**	**6.3**
	H/w (m)	2689	2597	2504	2411	2318	2226	2133	2040	1947	1855	1762	1669	1577	1484	1391	1298	1206	1113	1020	927
	Pos_1 (m)	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65	0.65
	Pos_2 (m)	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60
Terrain 1	**L2 (m)**	++	++	++	++	++	150	200	300	425	575	575	575	575	575	575	575	575	575	575	--
Terrain 2	**L2 (m)**	++	++	++	++	150	225	300	450	575	575	575	575	575	575	575	575	575	--	--	--
Terrain 3	**L2 (m)**	++	++	125	150	225	300	450	575	575	575	575	575	575	575	575	575	--	--	--	--
Terrain 4	**L2 (m)**	++	150	200	275	375	525	575	575	575	575	575	575	575	575	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Oriole	AWG/kcmil :	336	D =	18.83	mm	w =	0.781	kg/m	RTS =	75.8	kN	Const. : 30/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.0	21.2	20.5	19.7	19.0	18.2	17.4	16.7	15.9	15.2	14.4	13.6	12.9	12.1	11.4	10.6	9.9	9.1	8.3	7.6
	H/w (m)	2869	2770	2671	2572	2473	2374	2276	2177	2078	1979	1880	1781	1682	1583	1484	1385	1286	1187	1088	989
	Pos_1 (m)	1.15	1.15	1.10	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70
Terrain 1	L1 (m)	++	++	++	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	++	75	100	150	225	300	300	300	300	300	300	300	300	300	--	--
Terrain 3	L1 (m)	++	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 4	L1 (m)	++	++	++	75	125	175	250	300	300	300	300	300	300	300	300	--	--	--	--	--

Conductor	ACSR Oriole	AWG/kcmil :	336	D =	18.83	mm	w =	0.781	kg/m	RTS =	75.8	kN	Const. : 30/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.0	21.2	20.5	19.7	19.0	18.2	17.4	16.7	15.9	15.2	14.4	13.6	12.9	12.1	11.4	10.6	9.9	9.1	8.3	7.6
	H/w (m)	2869	2770	2671	2572	2473	2374	2276	2177	2078	1979	1880	1781	1682	1583	1484	1385	1286	1187	1088	989
	Pos_1 (m)	1.15	1.15	1.10	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70
	Pos_2 (m)	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.70	0.65	0.65	0.60
Terrain 1	L2 (m)	++	++	++	++	++	++	125	200	275	425	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	++	++	150	200	300	425	625	625	625	625	625	625	625	625	625	--	--
Terrain 3	L2 (m)	++	++	++	++	150	200	275	425	625	625	625	625	625	625	625	625	625	--	--	--
Terrain 4	L2 (m)	++	++	125	175	225	325	475	625	625	625	625	625	625	625	625	--	--	--	--	--

Conductor	ACSR Chickadee	AWG/kcmil :	398	D =	18.87	mm	w =	0.642	kg/m	RTS =	46.4	kN	Const. : 18/1	ibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	13.5	13.0	12.5	12.1	11.6	11.1	10.7	10.2	9.7	9.3	8.8	8.4	7.9	7.4	7.0	6.5	6.0	5.6	5.1	4.6
	H/w (m)	2137	2063	1989	1916	1842	1768	1695	1621	1547	1473	1400	1326	1252	1179	1105	1031	958	884	810	737
	Pos_1 (m)	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60
Terrain 1	L1 (m)	100	125	175	225	250	250	250	250	250	250	250	250	250	250	250	250	--	--	--	--
Terrain 2	L1 (m)	150	175	250	250	250	250	250	250	250	250	250	250	250	250	--	--	--	--	--	--
Terrain 3	L1 (m)	200	250	250	250	250	250	250	250	250	250	250	250	250	--	--	--	--	--	--	--
Terrain 4	L1 (m)	250	250	250	250	250	250	250	250	250	250	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Chickadee	AWG/kcmil :	398	D =	18.87	mm	w =	0.642	kg/m	RTS =	46.4	kN	Const. : 18/1	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	13.5	13.0	12.5	12.1	11.6	11.1	10.7	10.2	9.7	9.3	8.8	8.4	7.9	7.4	7.0	6.5	6.0	5.6	5.1	4.6
	H/w (m)	2137	2063	1989	1916	1842	1768	1695	1621	1547	1473	1400	1326	1252	1179	1105	1031	958	884	810	737
	Pos_1 (m)	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60
	Pos_2 (m)	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55
Terrain 1	L2 (m)	175	250	325	450	500	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--
Terrain 2	L2 (m)	275	375	500	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--
Terrain 3	L2 (m)	400	500	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--
Terrain 4	L2 (m)	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Ibis	AWG/kcmil :	398	D =	19.88	mm	w =	0.811	kg/m	RTS =	72.0	kN	Const. : 26/7	Vibration damper :	85323

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	20.9	20.2	19.4	18.7	18.0	17.3	16.6	15.8	15.1	14.4	13.7	13.0	12.2	11.5	10.8	10.1	9.4	8.6	7.9	7.2
	H/w (m)	2624	2534	2443	2353	2262	2172	2081	1991	1900	1810	1719	1629	1538	1448	1357	1267	1176	1086	995	905
	Pos_1 (m)	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70
Terrain 1	L1 (m)	++	++	++	++	75	100	125	200	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 3	L1 (m)	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 4	L1 (m)	75	100	125	175	250	300	300	300	300	300	300	300	300	300	--	--	--	--	--	--

Conductor	ACSR Ibis	AWG/kcmil :	398	D =	19.88	mm	w =	0.811	kg/m	RTS =	72.0	kN	Const. : 26/7	Vibration damper :	85323

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	20.9	20.2	19.4	18.7	18.0	17.3	16.6	15.8	15.1	14.4	13.7	13.0	12.2	11.5	10.8	10.1	9.4	8.6	7.9	7.2
	H/w (m)	2624	2534	2443	2353	2262	2172	2081	1991	1900	1810	1719	1629	1538	1448	1357	1267	1176	1086	995	905
	Pos_1 (m)	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70
	Pos_2 (m)	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.60
Terrain 1	L2 (m)	++	++	++	++	125	200	275	400	575	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	++	++	150	200	300	425	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 3	L2 (m)	++	125	150	200	300	425	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 4	L2 (m)	150	175	250	350	500	600	600	600	600	600	600	600	600	600	--	--	--	--	--	--

Conductor	ACSR Lark	AWG/kcmil :	398	D =	20.46	mm	w =	0.923	kg/m	RTS =	88.9	kN	Const. : 30/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.8	24.9	24.0	23.1	22.2	21.3	20.4	19.6	18.7	17.8	16.9	16.0	15.1	14.2	13.3	12.4	11.6	10.7	9.8	8.9
	H/w (m)	2847	2749	2651	2553	2455	2356	2258	2160	2062	1964	1865	1767	1669	1571	1473	1375	1276	1178	1080	982
	Pos_1 (m)	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.75	0.75
Terrain 1	L1 (m)	++	++	++	++	++	++	75	100	175	250	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	++	75	125	175	250	350	350	350	350	350	350	350	350	350	--	--
Terrain 3	L1 (m)	++	++	++	++	75	125	175	250	350	350	350	350	350	350	350	350	350	--	--	--
Terrain 4	L1 (m)	++	++	75	100	125	200	275	350	350	350	350	350	350	350	350	--	--	--	--	--

Conductor	ACSR Lark	AWG/kcmil :	398	D =	20.46	mm	w =	0.923	kg/m	RTS =	88.9	kN	Const. : 30/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.8	24.9	24.0	23.1	22.2	21.3	20.4	19.6	18.7	17.8	16.9	16.0	15.1	14.2	13.3	12.4	11.6	10.7	9.8	8.9
	H/w (m)	2847	2749	2651	2553	2455	2356	2258	2160	2062	1964	1865	1767	1669	1571	1473	1375	1276	1178	1080	982
	Pos_1 (m)	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.75	0.75
	Pos_2 (m)	1.15	1.10	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65
Terrain 1	L2 (m)	++	++	++	++	++	++	150	225	325	475	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	++	125	175	225	325	500	675	675	675	675	675	675	675	675	675	--	--
Terrain 3	L2 (m)	++	++	++	125	175	225	325	475	675	675	675	675	675	675	675	675	675	--	--	--
Terrain 4	L2 (m)	++	++	150	200	275	375	550	675	675	675	675	675	675	675	675	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Pelican	AWG/kcmil :	477	D =	20.68	mm	w =	0.770	kg/m	RTS =	54.8	kN	Const. : 18/1	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	15.9	15.3	14.8	14.2	13.7	13.2	12.6	12.1	11.5	11.0	10.4	9.9	9.3	8.8	8.2	7.7	7.1	6.6	6.0	5.5
	H/w (m)	2104	2031	1959	1886	1814	1741	1669	1596	1523	1451	1378	1306	1233	1161	1088	1016	943	871	798	725
	Pos_1 (m)	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65	0.65
Terrain 1	L1 (m)	125	150	200	275	275	275	275	275	275	275	275	275	275	275	275	275	--	--	--	--
Terrain 2	L1 (m)	175	225	275	275	275	275	275	275	275	275	275	275	275	275	--	--	--	--	--	--
Terrain 3	L1 (m)	250	275	275	275	275	275	275	275	275	275	275	275	275	--	--	--	--	--	--	--
Terrain 4	L1 (m)	275	275	275	275	275	275	275	275	275	275	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Pelican	AWG/kcmil :	477	D =	20.68	mm	w =	0.770	kg/m	RTS =	54.8	kN	Const. : 18/1	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	15.9	15.3	14.8	14.2	13.7	13.2	12.6	12.1	11.5	11.0	10.4	9.9	9.3	8.8	8.2	7.7	7.1	6.6	6.0	5.5
	H/w (m)	2104	2031	1959	1886	1814	1741	1669	1596	1523	1451	1378	1306	1233	1161	1088	1016	943	871	798	725
	Pos_1 (m)	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65	0.65
	Pos_2 (m)	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60
Terrain 1	L2 (m)	225	300	400	550	550	550	550	550	550	550	550	550	550	550	550	550	--	--	--	--
Terrain 2	L2 (m)	350	475	550	550	550	550	550	550	550	550	550	550	550	550	--	--	--	--	--	--
Terrain 3	L2 (m)	500	550	550	550	550	550	550	550	550	550	550	550	550	--	--	--	--	--	--	--
Terrain 4	L2 (m)	550	550	550	550	550	550	550	550	550	550	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Toucan	AWG/kcmil :	477	D =	21.19	mm	w =	0.851	kg/m	RTS =	68.6	kN	Const. : 22/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	19.9	19.2	18.5	17.8	17.2	16.5	15.8	15.1	14.4	13.7	13.0	12.3	11.7	11.0	10.3	9.6	8.9	8.2	7.5	6.9
	H/w (m)	2383	2301	2219	2136	2054	1972	1890	1808	1726	1643	1561	1479	1397	1315	1233	1150	1068	986	904	822
	Pos_1 (m)	1.20	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Terrain 1	L1 (m)	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	75	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 3	L1 (m)	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--	--
Terrain 4	L1 (m)	150	200	300	300	300	300	300	300	300	300	300	300	--	--	--	--	--	--	--	--

Conductor	ACSR Toucan	AWG/kcmil :	477	D =	21.19	mm	w =	0.851	kg/m	RTS =	68.6	kN	Const. : 22/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	19.9	19.2	18.5	17.8	17.2	16.5	15.8	15.1	14.4	13.7	13.0	12.3	11.7	11.0	10.3	9.6	8.9	8.2	7.5	6.9
	H/w (m)	2383	2301	2219	2136	2054	1972	1890	1808	1726	1643	1561	1479	1397	1315	1233	1150	1068	986	904	822
	Pos_1 (m)	1.20	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
	Pos_2 (m)	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65
Terrain 1	L2 (m)	++	125	150	225	300	425	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	125	175	250	325	450	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 3	L2 (m)	200	250	350	475	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--	--
Terrain 4	L2 (m)	300	425	575	600	600	600	600	600	600	600	600	600	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Hawk	AWG/kcmil :	477	D =	21.78	mm	w =	0.974	kg/m	RTS =	86.4	kN	Const. : 26/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.1	24.2	23.3	22.5	21.6	20.7	19.9	19.0	18.1	17.3	16.4	15.6	14.7	13.8	13.0	12.1	11.2	10.4	9.5	8.6
	H/w (m)	2622	2532	2441	2351	2261	2170	2080	1989	1899	1808	1718	1628	1537	1447	1356	1266	1176	1085	995	904
	Pos_1 (m)	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.85	0.80	0.75
Terrain 1	L1 (m)	++	++	++	++	75	100	150	225	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	++	75	125	150	225	325	325	325	325	325	325	325	325	325	325	--	--	--
Terrain 3	L1 (m)	++	75	75	125	175	225	325	325	325	325	325	325	325	325	325	325	--	--	--	--
Terrain 4	L1 (m)	75	100	150	200	275	325	325	325	325	325	325	325	325	325	--	--	--	--	--	--

Conductor	ACSR Hawk	AWG/kcmil :	477	D =	21.78	mm	w =	0.974	kg/m	RTS =	86.4	kN	Const. : 26/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.1	24.2	23.3	22.5	21.6	20.7	19.9	19.0	18.1	17.3	16.4	15.6	14.7	13.8	13.0	12.1	11.2	10.4	9.5	8.6
	H/w (m)	2622	2532	2441	2351	2261	2170	2080	1989	1899	1808	1718	1628	1537	1447	1356	1266	1176	1085	995	904
	Pos_1 (m)	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.85	0.80	0.75
	Pos_2 (m)	1.15	1.15	1.10	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70	0.70
Terrain 1	L2 (m)	++	++	++	++	150	200	300	425	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	++	125	175	225	325	450	675	675	675	675	675	675	675	675	675	675	--	--	--
Terrain 3	L2 (m)	++	125	175	225	325	450	650	675	675	675	675	675	675	675	675	675	--	--	--	--
Terrain 4	L2 (m)	150	200	275	400	550	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--

Conductor	ACSR Hen	AWG/kcmil :	477	D =	22.42	mm	w =	1.108	kg/m	RTS =	104.0	kN	Const. : 30/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.2	29.1	28.1	27.0	26.0	25.0	23.9	22.9	21.8	20.8	19.8	18.7	17.7	16.6	15.6	14.6	13.5	12.5	11.4	10.4
	H/w (m)	2775	2679	2583	2488	2392	2296	2201	2105	2009	1914	1818	1722	1627	1531	1435	1340	1244	1148	1052	957
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
Terrain 1	L1 (m)	++	++	++	++	++	75	100	150	225	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	75	100	150	225	350	375	375	375	375	375	375	375	375	375	--	--
Terrain 3	L1 (m)	++	++	++	75	100	150	225	325	375	375	375	375	375	375	375	375	375	--	--	--
Terrain 4	L1 (m)	++	75	100	125	175	275	375	375	375	375	375	375	375	375	375	--	--	--	--	--

Conductor	ACSR Hen	AWG/kcmil :	477	D =	22.42	mm	w =	1.108	kg/m	RTS =	104.0	kN	Const. : 30/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.2	29.1	28.1	27.0	26.0	25.0	23.9	22.9	21.8	20.8	19.8	18.7	17.7	16.6	15.6	14.6	13.5	12.5	11.4	10.4
	H/w (m)	2775	2679	2583	2488	2392	2296	2201	2105	2009	1914	1818	1722	1627	1531	1435	1340	1244	1148	1052	957
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
	Pos_2 (m)	1.20	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75	0.70
Terrain 1	L2 (m)	++	++	++	++	++	150	200	300	450	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	125	150	225	325	450	675	750	750	750	750	750	750	750	750	750	--	--
Terrain 3	L2 (m)	++	++	125	150	225	325	450	650	750	750	750	750	750	750	750	750	750	--	--	--
Terrain 4	L2 (m)	++	150	200	275	375	525	750	750	750	750	750	750	750	750	750	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Heron	AWG/kcmil :	500	D =	22.95	mm	w =	1.161	kg/m	RTS =	109.0	kN	Const. : 30/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	31.6	30.5	29.4	28.3	27.3	26.2	25.1	24.0	22.9	21.8	20.7	19.6	18.5	17.4	16.4	15.3	14.2	13.1	12.0	10.9
	H/w (m)	2775	2680	2584	2488	2393	2297	2201	2105	2010	1914	1818	1723	1627	1531	1436	1340	1244	1148	1053	957
	Pos_1 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85	0.80
Terrain 1	L1 (m)	++	++	++	++	++	75	100	150	225	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	75	125	150	225	350	375	375	375	375	375	375	375	375	375	--	--
Terrain 3	L1 (m)	++	++	++	75	125	150	225	325	375	375	375	375	375	375	375	375	375	--	--	--
Terrain 4	L1 (m)	++	75	100	125	200	275	375	375	375	375	375	375	375	375	375	--	--	--	--	--

Conductor	ACSR Heron	AWG/kcmil :	500	D =	22.95	mm	w =	1.161	kg/m	RTS =	109.0	kN	Const. : 30/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	31.6	30.5	29.4	28.3	27.3	26.2	25.1	24.0	22.9	21.8	20.7	19.6	18.5	17.4	16.4	15.3	14.2	13.1	12.0	10.9
	H/w (m)	2775	2680	2584	2488	2393	2297	2201	2105	2010	1914	1818	1723	1627	1531	1436	1340	1244	1148	1053	957
	Pos_1 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85	0.80
	Pos_2 (m)	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.75	0.75
Terrain 1	L2 (m)	++	++	++	++	++	150	225	300	450	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	125	150	225	325	475	700	750	750	750	750	750	750	750	750	750	--	--
Terrain 3	L2 (m)	++	++	125	175	225	325	450	675	750	750	750	750	750	750	750	750	750	--	--	--
Terrain 4	L2 (m)	++	150	200	275	375	550	750	750	750	750	750	750	750	750	750	--	--	--	--	--

Conductor	ACSR Shelter Bay	AWG/kcmil :	504	D =	21.79	mm	w =	0.900	kg/m	RTS =	71.7	kN	Const. : 22/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	20.8	20.1	19.4	18.6	17.9	17.2	16.5	15.8	15.1	14.3	13.6	12.9	12.2	11.5	10.8	10.0	9.3	8.6	7.9	7.2
	H/w (m)	2355	2274	2193	2111	2030	1949	1868	1787	1705	1624	1543	1462	1381	1299	1218	1137	1056	975	893	812
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.80	0.75	0.70
Terrain 1	L1 (m)	++	75	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 3	L1 (m)	100	150	200	275	300	300	300	300	300	300	300	300	300	300	--	--	--	--	--	--
Terrain 4	L1 (m)	175	250	300	300	300	300	300	300	300	300	300	300	--	--	--	--	--	--	--	--

Conductor	ACSR Shelter Bay	AWG/kcmil :	504	D =	21.79	mm	w =	0.900	kg/m	RTS =	71.7	kN	Const. : 22/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	20.8	20.1	19.4	18.6	17.9	17.2	16.5	15.8	15.1	14.3	13.6	12.9	12.2	11.5	10.8	10.0	9.3	8.6	7.9	7.2
	H/w (m)	2355	2274	2193	2111	2030	1949	1868	1787	1705	1624	1543	1462	1381	1299	1218	1137	1056	975	893	812
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.80	0.75	0.70
	Pos_2 (m)	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65	0.65
Terrain 1	L2 (m)	++	125	175	250	350	475	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	150	200	275	375	525	625	625	625	625	625	625	625	625	625	625	625	--	--	--	--
Terrain 3	L2 (m)	225	275	400	525	625	625	625	625	625	625	625	625	625	625	--	--	--	--	--	--
Terrain 4	L2 (m)	350	475	625	625	625	625	625	625	625	625	625	625	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Sapsucker	AWG/kcmil :	557	D =	22.88	mm	w =	0.993	kg/m	RTS =	79.1	kN	Const. : 22/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.9	22.1	21.4	20.6	19.8	19.0	18.2	17.4	16.6	15.8	15.0	14.2	13.4	12.7	11.9	11.1	10.3	9.5	8.7	7.9
	H/w (m)	2355	2274	2192	2111	2030	1949	1868	1786	1705	1624	1543	1462	1380	1299	1218	1137	1056	974	893	812
	Pos_1 (m)	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.80	0.75
Terrain 1	L1 (m)	++	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	75	100	150	200	275	325	325	325	325	325	325	325	325	325	325	325	--	--	--	--
Terrain 3	L1 (m)	100	150	200	275	325	325	325	325	325	325	325	325	325	325	--	--	--	--	--	--
Terrain 4	L1 (m)	175	250	325	325	325	325	325	325	325	325	325	325	--	--	--	--	--	--	--	--

Conductor	ACSR Sapsucker	AWG/kcmil :	557	D =	22.88	mm	w =	0.993	kg/m	RTS =	79.1	kN	Const. : 22/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.9	22.1	21.4	20.6	19.8	19.0	18.2	17.4	16.6	15.8	15.0	14.2	13.4	12.7	11.9	11.1	10.3	9.5	8.7	7.9
	H/w (m)	2355	2274	2192	2111	2030	1949	1868	1786	1705	1624	1543	1462	1380	1299	1218	1137	1056	974	893	812
	Pos_1 (m)	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.80	0.75
	Pos_2 (m)	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70	0.65
Terrain 1	L2 (m)	++	150	200	250	350	500	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	150	200	275	400	550	650	650	650	650	650	650	650	650	650	650	650	--	--	--	--
Terrain 3	L2 (m)	225	300	400	575	650	650	650	650	650	650	650	650	650	650	--	--	--	--	--	--
Terrain 4	L2 (m)	375	500	650	650	650	650	650	650	650	650	650	650	--	--	--	--	--	--	--	--

Conductor	ACSR Dove	AWG/kcmil :	557	D =	23.54	mm	w =	1.137	kg/m	RTS =	99.9	kN	Const. : 26/7	Vibration damper :	85344

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.0	28.0	27.0	26.0	25.0	24.0	23.0	22.0	21.0	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0
	H/w (m)	2597	2508	2418	2329	2239	2150	2060	1970	1881	1791	1702	1612	1523	1433	1343	1254	1164	1075	985	896
	Pos_1 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
Terrain 1	L1 (m)	++	++	++	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	75	100	125	200	275	350	350	350	350	350	350	350	350	350	350	--	--	--
Terrain 3	L1 (m)	++	75	100	125	200	275	350	350	350	350	350	350	350	350	350	350	--	--	--	--
Terrain 4	L1 (m)	100	125	175	225	325	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--

Conductor	ACSR Dove	AWG/kcmil :	557	D =	23.54	mm	w =	1.137	kg/m	RTS =	99.9	kN	Const. : 26/7	Vibration damper :	85344

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.0	28.0	27.0	26.0	25.0	24.0	23.0	22.0	21.0	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0
	H/w (m)	2597	2508	2418	2329	2239	2150	2060	1970	1881	1791	1702	1612	1523	1433	1343	1254	1164	1075	985	896
	Pos_1 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
	Pos_2 (m)	1.25	1.20	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75
Terrain 1	L2 (m)	++	++	++	125	175	250	350	500	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	++	150	200	275	375	525	725	725	725	725	725	725	725	725	725	725	--	--	--
Terrain 3	L2 (m)	++	150	200	275	375	550	725	725	725	725	725	725	725	725	725	725	--	--	--	--
Terrain 4	L2 (m)	175	250	325	450	650	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Eagle	AWG/kcmil :	557	D =	24.22	mm	w =	1.292	kg/m	RTS =	121.0	kN	Const. : 30/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	35.1	33.9	32.7	31.5	30.3	29.0	27.8	26.6	25.4	24.2	23.0	21.8	20.6	19.4	18.2	16.9	15.7	14.5	13.3	12.1
	H/w (m)	2769	2673	2578	2482	2387	2291	2196	2100	2005	1909	1814	1718	1623	1527	1432	1337	1241	1146	1050	955
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
Terrain 1	L1 (m)	++	++	++	++	++	75	125	175	250	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	75	125	175	250	375	400	400	400	400	400	400	400	400	400	--	--
Terrain 3	L1 (m)	++	++	75	100	125	175	250	350	400	400	400	400	400	400	400	400	400	--	--	--
Terrain 4	L1 (m)	++	75	100	150	200	300	400	400	400	400	400	400	400	400	400	--	--	--	--	--

Conductor	ACSR Eagle	AWG/kcmil :	557	D =	24.22	mm	w =	1.292	kg/m	RTS =	121.0	kN	Const. : 30/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	35.1	33.9	32.7	31.5	30.3	29.0	27.8	26.6	25.4	24.2	23.0	21.8	20.6	19.4	18.2	16.9	15.7	14.5	13.3	12.1
	H/w (m)	2769	2673	2578	2482	2387	2291	2196	2100	2005	1909	1814	1718	1623	1527	1432	1337	1241	1146	1050	955
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
	Pos_2 (m)	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.75
Terrain 1	L2 (m)	++	++	++	++	125	150	225	325	475	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	125	175	250	350	500	750	800	800	800	800	800	800	800	800	800	--	--
Terrain 3	L2 (m)	++	++	125	175	250	350	500	725	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 4	L2 (m)	125	150	200	300	400	575	800	800	800	800	800	800	800	800	800	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	605	D =	23.86	mm	w =	1.080	kg/m	RTS =	85.0	kN	Const. : 22/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	24.7	23.8	23.0	22.1	21.3	20.4	19.6	18.7	17.9	17.0	16.2	15.3	14.5	13.6	12.8	11.9	11.1	10.2	9.4	8.5
	H/w (m)	2327	2246	2166	2086	2006	1925	1845	1765	1685	1605	1524	1444	1364	1284	1203	1123	1043	963	883	802
	Pos_1 (m)	1.30	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.80
Terrain 1	L1 (m)	++	75	100	150	200	275	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	100	125	175	225	325	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--
Terrain 3	L1 (m)	125	175	225	325	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--
Terrain 4	L1 (m)	225	300	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	605	D =	23.86	mm	w =	1.080	kg/m	RTS =	85.0	kN	Const. : 22/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	24.7	23.8	23.0	22.1	21.3	20.4	19.6	18.7	17.9	17.0	16.2	15.3	14.5	13.6	12.8	11.9	11.1	10.2	9.4	8.5
	H/w (m)	2327	2246	2166	2086	2006	1925	1845	1765	1685	1605	1524	1444	1364	1284	1203	1123	1043	963	883	802
	Pos_1 (m)	1.30	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.80
	Pos_2 (m)	1.20	1.15	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Terrain 1	L2 (m)	125	150	225	300	400	575	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	175	250	325	450	625	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--
Terrain 3	L2 (m)	250	350	475	650	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--
Terrain 4	L2 (m)	425	575	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Duck	AWG/kcmil :	605	D =	24.19	mm	w =	1.157	kg/m	RTS =	100.0	kN	Const. : 54/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.0	28.0	27.0	26.0	25.0	24.0	23.0	22.0	21.0	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0
	H/w (m)	2555	2467	2379	2291	2203	2115	2026	1938	1850	1762	1674	1586	1498	1410	1322	1233	1145	1057	969	881
	Pos_1 (m)	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85	0.85
Terrain 1	L1 (m)	++	++	++	75	100	150	200	275	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	75	100	150	225	300	350	350	350	350	350	350	350	350	350	350	--	--	--
Terrain 3	L1 (m)	++	75	125	150	225	300	350	350	350	350	350	350	350	350	350	350	--	--	--	--
Terrain 4	L1 (m)	100	150	200	250	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--

Conductor	ACSR Duck	AWG/kcmil :	605	D =	24.19	mm	w =	1.157	kg/m	RTS =	100.0	kN	Const. : 54/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.0	28.0	27.0	26.0	25.0	24.0	23.0	22.0	21.0	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0
	H/w (m)	2555	2467	2379	2291	2203	2115	2026	1938	1850	1762	1674	1586	1498	1410	1322	1233	1145	1057	969	881
	Pos_1 (m)	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85	0.85
	Pos_2 (m)	1.25	1.25	1.20	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75
Terrain 1	L2 (m)	++	++	++	150	200	275	400	575	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	125	150	225	300	425	600	725	725	725	725	725	725	725	725	725	725	--	--	--
Terrain 3	L2 (m)	125	175	225	300	425	600	725	725	725	725	725	725	725	725	725	725	--	--	--	--
Terrain 4	L2 (m)	200	275	375	525	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--	--

Conductor	ACSR Peace River	AWG/kcmil :	628	D =	24.13	mm	w =	1.091	kg/m	RTS =	88.3	kN	Const. : 48/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.6	24.7	23.8	23.0	22.1	21.2	20.3	19.4	18.5	17.7	16.8	15.9	15.0	14.1	13.2	12.4	11.5	10.6	9.7	8.8
	H/w (m)	2393	2310	2228	2145	2063	1980	1898	1815	1733	1650	1568	1485	1403	1320	1238	1155	1073	990	908	825
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
Terrain 1	L1 (m)	++	75	75	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	75	100	125	175	250	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--
Terrain 3	L1 (m)	100	125	175	250	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--
Terrain 4	L1 (m)	175	225	325	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--	--

Conductor	ACSR Peace River	AWG/kcmil :	628	D =	24.13	mm	w =	1.091	kg/m	RTS =	88.3	kN	Const. : 48/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.6	24.7	23.8	23.0	22.1	21.2	20.3	19.4	18.5	17.7	16.8	15.9	15.0	14.1	13.2	12.4	11.5	10.6	9.7	8.8
	H/w (m)	2393	2310	2228	2145	2063	1980	1898	1815	1733	1650	1568	1485	1403	1320	1238	1155	1073	990	908	825
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
	Pos_2 (m)	1.20	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75	0.70
Terrain 1	L2 (m)	++	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	150	200	250	350	500	675	675	675	675	675	675	675	675	675	675	675	--	--	--	--
Terrain 3	L2 (m)	200	275	375	525	675	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--
Terrain 4	L2 (m)	350	450	625	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Goldfinch	AWG/kcmil :	636	D =	24.47	mm	w =	1.135	kg/m	RTS =	89.3	kN	Const. : 22/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.9	25.0	24.1	23.2	22.3	21.4	20.5	19.6	18.8	17.9	17.0	16.1	15.2	14.3	13.4	12.5	11.6	10.7	9.8	8.9
	H/w (m)	2326	2246	2165	2085	2005	1925	1845	1764	1684	1604	1524	1444	1363	1283	1203	1123	1043	962	882	802
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
Terrain 1	L1 (m)	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	100	125	175	225	325	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--
Terrain 3	L1 (m)	125	175	250	325	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--
Terrain 4	L1 (m)	225	300	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--	--

Conductor	ACSR Goldfinch	AWG/kcmil :	636	D =	24.47	mm	w =	1.135	kg/m	RTS =	89.3	kN	Const. : 22/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	25.9	25.0	24.1	23.2	22.3	21.4	20.5	19.6	18.8	17.9	17.0	16.1	15.2	14.3	13.4	12.5	11.6	10.7	9.8	8.9
	H/w (m)	2326	2246	2165	2085	2005	1925	1845	1764	1684	1604	1524	1444	1363	1283	1203	1123	1043	962	882	802
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.85	0.85	0.80
	Pos_2 (m)	1.20	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75	0.70
Terrain 1	L2 (m)	125	175	225	300	425	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	175	250	350	475	650	700	700	700	700	700	700	700	700	700	700	--	--	--	--	--
Terrain 3	L2 (m)	275	350	475	675	700	700	700	700	700	700	700	700	700	700	--	--	--	--	--	--
Terrain 4	L2 (m)	450	600	700	700	700	700	700	700	700	700	700	700	--	--	--	--	--	--	--	--

Conductor	ACSR Goose	AWG/kcmil :	636	D =	24.80	mm	w =	1.217	kg/m	RTS =	105.0	kN	Const. : 54/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.5	29.4	28.4	27.3	26.3	25.2	24.2	23.1	22.1	21.0	20.0	18.9	17.9	16.8	15.8	14.7	13.7	12.6	11.6	10.5
	H/w (m)	2551	2463	2375	2287	2199	2111	2023	1935	1847	1759	1671	1583	1495	1407	1319	1231	1143	1055	967	879
	Pos_1 (m)	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85
Terrain 1	L1 (m)	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	75	125	150	225	325	375	375	375	375	375	375	375	375	375	375	--	--	--
Terrain 3	L1 (m)	75	75	125	150	225	325	375	375	375	375	375	375	375	375	375	375	--	--	--	--
Terrain 4	L1 (m)	100	150	200	275	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--

Conductor	ACSR Goose	AWG/kcmil :	636	D =	24.80	mm	w =	1.217	kg/m	RTS =	105.0	kN	Const. : 54/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.5	29.4	28.4	27.3	26.3	25.2	24.2	23.1	22.1	21.0	20.0	18.9	17.9	16.8	15.8	14.7	13.7	12.6	11.6	10.5
	H/w (m)	2551	2463	2375	2287	2199	2111	2023	1935	1847	1759	1671	1583	1495	1407	1319	1231	1143	1055	967	879
	Pos_1 (m)	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85
	Pos_2 (m)	1.30	1.25	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.75
Terrain 1	L2 (m)	++	++	++	150	200	300	425	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	125	175	225	325	450	625	725	725	725	725	725	725	725	725	725	725	--	--	--
Terrain 3	L2 (m)	125	175	225	325	450	625	725	725	725	725	725	725	725	725	725	725	--	--	--	--
Terrain 4	L2 (m)	200	300	400	550	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Grosbeak	AWG/kcmil :	636	D =	25.16	mm	w =	1.299	kg/m	RTS =	111.0	kN	Const. : 26/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	32.2	31.1	30.0	28.9	27.8	26.6	25.5	24.4	23.3	22.2	21.1	20.0	18.9	17.8	16.7	15.5	14.4	13.3	12.2	11.1
	H/w (m)	2526	2439	2352	2265	2178	2091	2003	1916	1829	1742	1655	1568	1481	1394	1307	1219	1132	1045	958	871
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.95	0.90	0.85
Terrain 1	L1 (m)	++	++	75	75	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	125	175	250	350	375	375	375	375	375	375	375	375	375	375	--	--	--
Terrain 3	L1 (m)	75	100	125	175	250	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--
Terrain 4	L1 (m)	125	175	225	300	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--

Conductor	ACSR Grosbeak	AWG/kcmil :	636	D =	25.16	mm	w =	1.299	kg/m	RTS =	111.0	kN	Const. : 26/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	32.2	31.1	30.0	28.9	27.8	26.6	25.5	24.4	23.3	22.2	21.1	20.0	18.9	17.8	16.7	15.5	14.4	13.3	12.2	11.1
	H/w (m)	2526	2439	2352	2265	2178	2091	2003	1916	1829	1742	1655	1568	1481	1394	1307	1219	1132	1045	958	871
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.95	0.90	0.85
	Pos_2 (m)	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.75
Terrain 1	L2 (m)	++	++	125	175	250	325	475	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	150	200	250	350	500	725	775	775	775	775	775	775	775	775	775	775	--	--	--
Terrain 3	L2 (m)	150	200	275	375	525	725	775	775	775	775	775	775	775	775	775	--	--	--	--	--
Terrain 4	L2 (m)	250	325	450	625	775	775	775	775	775	775	775	775	775	--	--	--	--	--	--	--

Conductor	ACSR Egret	AWG/kcmil :	636	D =	25.89	mm	w =	1.466	kg/m	RTS =	141.0	kN	Const. : 30/19	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.9	39.5	38.1	36.7	35.3	33.8	32.4	31.0	29.6	28.2	26.8	25.4	24.0	22.6	21.2	19.7	18.3	16.9	15.5	14.1
	H/w (m)	2843	2745	2647	2549	2451	2353	2255	2157	2059	1961	1863	1765	1667	1569	1471	1373	1275	1177	1078	980
	Pos_1 (m)	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00	1.00	0.95
Terrain 1	L1 (m)	++	++	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	++	75	100	150	225	325	400	400	400	400	400	400	400	400	400	--	--
Terrain 3	L1 (m)	++	++	++	75	100	150	200	300	425	425	425	425	425	425	425	425	425	--	--	--
Terrain 4	L1 (m)	++	75	100	125	175	250	350	425	425	425	425	425	425	425	425	--	--	--	--	--

Conductor	ACSR Egret	AWG/kcmil :	636	D =	25.89	mm	w =	1.466	kg/m	RTS =	141.0	kN	Const. : 30/19	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.9	39.5	38.1	36.7	35.3	33.8	32.4	31.0	29.6	28.2	26.8	25.4	24.0	22.6	21.2	19.7	18.3	16.9	15.5	14.1
	H/w (m)	2843	2745	2647	2549	2451	2353	2255	2157	2059	1961	1863	1765	1667	1569	1471	1373	1275	1177	1078	980
	Pos_1 (m)	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00	1.00	0.95
	Pos_2 (m)	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.90	0.85
Terrain 1	L2 (m)	++	++	++	++	++	150	200	275	425	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	++	150	200	300	425	625	800	800	800	800	800	800	800	800	800	--	--
Terrain 3	L2 (m)	++	++	++	150	200	300	425	625	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 4	L2 (m)	++	125	175	250	350	500	700	800	800	800	800	800	800	800	800	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	667	D =	24.54	mm	w =	1.068	kg/m	RTS =	78.6	kN	Const. : 42/7	Vibration damper :	85544

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.8	22.0	21.2	20.4	19.7	18.9	18.1	17.3	16.5	15.7	14.9	14.1	13.4	12.6	11.8	11.0	10.2	9.4	8.6	7.9
	H/w (m)	2176	2101	2026	1951	1876	1801	1725	1650	1575	1500	1425	1350	1275	1200	1125	1050	975	900	825	750
	Pos_1 (m)	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.75
Terrain 1	L1 (m)	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	150	200	275	325	325	325	325	325	325	325	325	325	325	325	325	--	--	--	--	--
Terrain 3	L1 (m)	225	300	325	325	325	325	325	325	325	325	325	325	325	--	--	--	--	--	--	--
Terrain 4	L1 (m)	325	325	325	325	325	325	325	325	325	325	325	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	667	D =	24.54	mm	w =	1.068	kg/m	RTS =	78.6	kN	Const. : 42/7	Vibration damper :	85544

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	22.8	22.0	21.2	20.4	19.7	18.9	18.1	17.3	16.5	15.7	14.9	14.1	13.4	12.6	11.8	11.0	10.2	9.4	8.6	7.9
	H/w (m)	2176	2101	2026	1951	1876	1801	1725	1650	1575	1500	1425	1350	1275	1200	1125	1050	975	900	825	750
	Pos_1 (m)	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.75
	Pos_2 (m)	1.20	1.15	1.15	1.10	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75	0.75	0.70
Terrain 1	L2 (m)	200	275	375	500	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	300	400	550	650	650	650	650	650	650	650	650	650	650	650	650	--	--	--	--	--
Terrain 3	L2 (m)	450	600	650	650	650	650	650	650	650	650	650	650	650	--	--	--	--	--	--	--
Terrain 4	L2 (m)	650	650	650	650	650	650	650	650	650	650	650	--	--	--	--	--	--	--	--	--

Conductor	ACSR Gull	AWG/kcmil :	667	D =	25.40	mm	w =	1.275	kg/m	RTS =	109.0	kN	Const. : 54/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	31.6	30.5	29.4	28.3	27.3	26.2	25.1	24.0	22.9	21.8	20.7	19.6	18.5	17.4	16.4	15.3	14.2	13.1	12.0	10.9
	H/w (m)	2527	2440	2353	2266	2179	2092	2004	1917	1830	1743	1656	1569	1481	1394	1307	1220	1133	1046	959	871
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
Terrain 1	L1 (m)	++	++	++	75	125	150	225	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	125	175	250	350	375	375	375	375	375	375	375	375	375	375	--	--	--
Terrain 3	L1 (m)	75	100	125	175	250	350	375	375	375	375	375	375	375	375	375	--	--	--	--	--
Terrain 4	L1 (m)	125	150	225	300	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--

Conductor	ACSR Gull	AWG/kcmil :	667	D =	25.40	mm	w =	1.275	kg/m	RTS =	109.0	kN	Const. : 54/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	31.6	30.5	29.4	28.3	27.3	26.2	25.1	24.0	22.9	21.8	20.7	19.6	18.5	17.4	16.4	15.3	14.2	13.1	12.0	10.9
	H/w (m)	2527	2440	2353	2266	2179	2092	2004	1917	1830	1743	1656	1569	1481	1394	1307	1220	1133	1046	959	871
	Pos_1 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
	Pos_2 (m)	1.30	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80	0.80
Terrain 1	L2 (m)	++	++	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	125	175	250	350	500	700	750	750	750	750	750	750	750	750	750	750	--	--	--
Terrain 3	L2 (m)	150	200	250	350	500	700	750	750	750	750	750	750	750	750	750	--	--	--	--	--
Terrain 4	L2 (m)	225	325	425	600	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	716	D =	25.41	mm	w =	1.147	kg/m	RTS =	84.3	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	24.4	23.6	22.8	21.9	21.1	20.2	19.4	18.5	17.7	16.9	16.0	15.2	14.3	13.5	12.6	11.8	11.0	10.1	9.3	8.4
	H/w (m)	2173	2098	2023	1948	1873	1798	1723	1648	1573	1498	1423	1349	1274	1199	1124	1049	974	899	824	749
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
Terrain 1	L1 (m)	100	150	200	250	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	150	225	300	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--
Terrain 3	L1 (m)	225	300	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--
Terrain 4	L1 (m)	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	716	D =	25.41	mm	w =	1.147	kg/m	RTS =	84.3	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	24.4	23.6	22.8	21.9	21.1	20.2	19.4	18.5	17.7	16.9	16.0	15.2	14.3	13.5	12.6	11.8	11.0	10.1	9.3	8.4
	H/w (m)	2173	2098	2023	1948	1873	1798	1723	1648	1573	1498	1423	1349	1274	1199	1124	1049	974	899	824	749
	Pos_1 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
	Pos_2 (m)	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.80	0.80	0.75	0.70
Terrain 1	L2 (m)	200	275	375	525	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	325	425	575	675	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--
Terrain 3	L2 (m)	450	625	675	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--	--
Terrain 4	L2 (m)	675	675	675	675	675	675	675	675	675	675	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Crow	AWG/kcmil :	716	D =	26.31	mm	w =	1.369	kg/m	RTS =	117.0	kN	Const. : 54/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	33.9	32.8	31.6	30.4	29.3	28.1	26.9	25.7	24.6	23.4	22.2	21.1	19.9	18.7	17.6	16.4	15.2	14.0	12.9	11.7
	H/w (m)	2526	2439	2352	2265	2178	2091	2004	1917	1830	1742	1655	1568	1481	1394	1307	1220	1133	1045	958	871
	Pos_1 (m)	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	1.00	0.95	0.90
Terrain 1	L1 (m)	++	++	75	75	125	175	225	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	125	175	250	375	400	400	400	400	400	400	400	400	400	400	--	--	--
Terrain 3	L1 (m)	75	100	125	175	250	375	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 4	L1 (m)	125	175	225	325	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--

Conductor	ACSR Crow	AWG/kcmil :	716	D =	26.31	mm	w =	1.369	kg/m	RTS =	117.0	kN	Const. : 54/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	33.9	32.8	31.6	30.4	29.3	28.1	26.9	25.7	24.6	23.4	22.2	21.1	19.9	18.7	17.6	16.4	15.2	14.0	12.9	11.7
	H/w (m)	2526	2439	2352	2265	2178	2091	2004	1917	1830	1742	1655	1568	1481	1394	1307	1220	1133	1045	958	871
	Pos_1 (m)	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	1.00	0.95	0.90
	Pos_2 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
Terrain 1	L2 (m)	++	++	125	175	250	325	475	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	150	200	250	375	500	725	775	775	775	775	775	775	775	775	775	775	--	--	--
Terrain 3	L2 (m)	150	200	275	375	525	725	775	775	775	775	775	775	775	775	775	--	--	--	--	--
Terrain 4	L2 (m)	250	325	450	625	775	775	775	775	775	775	775	775	775	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Starling	AWG/kcmil :	716	D =	26.69	mm	w =	1.461	kg/m	RTS =	125.0	kN	Const. : 26/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.3	35.0	33.8	32.5	31.3	30.0	28.8	27.5	26.3	25.0	23.8	22.5	21.3	20.0	18.8	17.5	16.3	15.0	13.8	12.5
	H/w (m)	2529	2442	2355	2268	2180	2093	2006	1919	1832	1744	1657	1570	1483	1395	1308	1221	1134	1047	959	872
	Pos_1 (m)	1.55	1.50	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.05	1.00	0.95	0.90
Terrain 1	L1 (m)	++	++	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	125	200	275	375	400	400	400	400	400	400	400	400	400	400	--	--	--
Terrain 3	L1 (m)	75	100	150	200	275	375	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 4	L1 (m)	125	175	225	325	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--

Conductor	ACSR Starling	AWG/kcmil :	716	D =	26.69	mm	w =	1.461	kg/m	RTS =	125.0	kN	Const. : 26/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.3	35.0	33.8	32.5	31.3	30.0	28.8	27.5	26.3	25.0	23.8	22.5	21.3	20.0	18.8	17.5	16.3	15.0	13.8	12.5
	H/w (m)	2529	2442	2355	2268	2180	2093	2006	1919	1832	1744	1657	1570	1483	1395	1308	1221	1134	1047	959	872
	Pos_1 (m)	1.55	1.50	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.05	1.00	0.95	0.90
	Pos_2 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85	0.80
Terrain 1	L2 (m)	++	++	125	175	250	350	500	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	++	150	200	275	375	525	750	800	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 3	L2 (m)	150	200	275	400	550	775	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	250	350	475	650	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

Conductor	ACSR Redwing	AWG/kcmil :	716	D =	27.45	mm	w =	1.648	kg/m	RTS =	154.0	kN	Const. : 30/19	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.7	43.1	41.6	40.0	38.5	37.0	35.4	33.9	32.3	30.8	29.3	27.7	26.2	24.6	23.1	21.6	20.0	18.5	16.9	15.4
	H/w (m)	2762	2667	2572	2477	2381	2286	2191	2096	2000	1905	1810	1715	1619	1524	1429	1334	1238	1143	1048	953
	Pos_1 (m)	1.65	1.65	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	0.95
Terrain 1	L1 (m)	++	++	++	++	75	100	125	200	275	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	75	100	150	200	300	400	400	400	400	400	400	400	400	400	400	--	--
Terrain 3	L1 (m)	++	++	75	100	150	200	275	425	450	450	450	450	450	450	450	450	450	--	--	--
Terrain 4	L1 (m)	75	100	125	175	225	325	450	450	450	450	450	450	450	450	450	--	--	--	--	--

Conductor	ACSR Redwing	AWG/kcmil :	716	D =	27.45	mm	w =	1.648	kg/m	RTS =	154.0	kN	Const. : 30/19	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.7	43.1	41.6	40.0	38.5	37.0	35.4	33.9	32.3	30.8	29.3	27.7	26.2	24.6	23.1	21.6	20.0	18.5	16.9	15.4
	H/w (m)	2762	2667	2572	2477	2381	2286	2191	2096	2000	1905	1810	1715	1619	1524	1429	1334	1238	1143	1048	953
	Pos_1 (m)	1.65	1.65	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	0.95
	Pos_2 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.90
Terrain 1	L2 (m)	++	++	++	++	125	175	275	375	550	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	150	200	275	400	575	800	800	800	800	800	800	800	800	800	800	--	--
Terrain 3	L2 (m)	++	++	150	200	275	400	575	800	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 4	L2 (m)	125	175	250	325	475	675	800	800	800	800	800	800	800	800	800	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Macaw	AWG/kcmil :	795	D =	26.79	mm	w =	1.274	kg/m	RTS =	93.7	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	27.2	26.2	25.3	24.4	23.4	22.5	21.6	20.6	19.7	18.7	17.8	16.9	15.9	15.0	14.1	13.1	12.2	11.2	10.3	9.4
	H/w (m)	2174	2099	2024	1949	1874	1799	1724	1649	1574	1499	1424	1350	1275	1200	1125	1050	975	900	825	750
	Pos_1 (m)	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.90	0.85
Terrain 1	L1 (m)	100	150	200	275	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	175	225	300	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--
Terrain 3	L1 (m)	250	325	350	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--
Terrain 4	L1 (m)	350	350	350	350	350	350	350	350	350	350	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Macaw	AWG/kcmil :	795	D =	26.79	mm	w =	1.274	kg/m	RTS =	93.7	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	27.2	26.2	25.3	24.4	23.4	22.5	21.6	20.6	19.7	18.7	17.8	16.9	15.9	15.0	14.1	13.1	12.2	11.2	10.3	9.4
	H/w (m)	2174	2099	2024	1949	1874	1799	1724	1649	1574	1499	1424	1350	1275	1200	1125	1050	975	900	825	750
	Pos_1 (m)	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.90	0.85
	Pos_2 (m)	1.30	1.25	1.25	1.20	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.85	0.80	0.75
Terrain 1	L2 (m)	225	300	400	550	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	325	450	600	725	725	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--
Terrain 3	L2 (m)	475	650	725	725	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--	--
Terrain 4	L2 (m)	725	725	725	725	725	725	725	725	725	725	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Condor	AWG/kcmil :	795	D =	27.73	mm	w =	1.521	kg/m	RTS =	127.0	kN	Const. : 54/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.8	35.6	34.3	33.0	31.8	30.5	29.2	27.9	26.7	25.4	24.1	22.9	21.6	20.3	19.1	17.8	16.5	15.2	14.0	12.7
	H/w (m)	2468	2383	2298	2213	2128	2043	1958	1873	1787	1702	1617	1532	1447	1362	1277	1192	1106	1021	936	851
	Pos_1 (m)	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00	1.00	0.95
Terrain 1	L1 (m)	++	++	75	100	150	225	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	125	175	225	325	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	125	175	250	325	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 4	L1 (m)	150	225	300	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--

Conductor	ACSR Condor	AWG/kcmil :	795	D =	27.73	mm	w =	1.521	kg/m	RTS =	127.0	kN	Const. : 54/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.8	35.6	34.3	33.0	31.8	30.5	29.2	27.9	26.7	25.4	24.1	22.9	21.6	20.3	19.1	17.8	16.5	15.2	14.0	12.7
	H/w (m)	2468	2383	2298	2213	2128	2043	1958	1873	1787	1702	1617	1532	1447	1362	1277	1192	1106	1021	936	851
	Pos_1 (m)	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00	1.00	0.95
	Pos_2 (m)	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.05	1.00	0.95	0.90	0.90	0.85
Terrain 1	L2 (m)	++	125	150	225	300	425	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	125	175	250	325	475	650	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	200	250	350	475	675	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	325	425	575	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Drake	AWG/kcmil :	795	D =	28.13	mm	w =	1.632	kg/m	RTS =	139.0	kN	Const. : 26/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.8	33.4	32.0	30.6	29.2	27.8	26.4	25.0	23.6	22.2	20.9	19.5	18.1	16.7	15.3	13.9
	H/w (m)	2518	2431	2344	2257	2171	2084	1997	1910	1823	1736	1650	1563	1476	1389	1302	1215	1129	1042	955	868
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
Terrain 1	L1 (m)	++	++	75	100	125	200	275	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	++	75	100	150	200	300	400	400	400	400	400	400	400	400	400	400	400	--	--	--
Terrain 3	L1 (m)	75	125	150	225	300	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--
Terrain 4	L1 (m)	150	200	250	350	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--

Conductor	ACSR Drake	AWG/kcmil :	795	D =	28.13	mm	w =	1.632	kg/m	RTS =	139.0	kN	Const. : 26/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.8	33.4	32.0	30.6	29.2	27.8	26.4	25.0	23.6	22.2	20.9	19.5	18.1	16.7	15.3	13.9
	H/w (m)	2518	2431	2344	2257	2171	2084	1997	1910	1823	1736	1650	1563	1476	1389	1302	1215	1129	1042	955	868
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
	Pos_2 (m)	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.85
Terrain 1	L2 (m)	++	++	150	200	275	375	550	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	125	150	225	300	425	575	800	800	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 3	L2 (m)	175	225	300	425	600	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	275	375	525	725	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

Conductor	ACSR Mallard	AWG/kcmil :	795	D =	28.95	mm	w =	1.832	kg/m	RTS =	171.0	kN	Const. : 30/19	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	49.6	47.9	46.2	44.5	42.8	41.0	39.3	37.6	35.9	34.2	32.5	30.8	29.1	27.4	25.7	23.9	22.2	20.5	18.8	17.1
	H/w (m)	2759	2664	2569	2474	2379	2284	2188	2093	1998	1903	1808	1713	1618	1522	1427	1332	1237	1142	1047	951
	Pos_1 (m)	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.10	1.05
Terrain 1	L1 (m)	++	++	++	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	300	--
Terrain 2	L1 (m)	++	++	++	75	100	150	200	300	400	400	400	400	400	400	400	400	400	400	--	--
Terrain 3	L1 (m)	++	++	75	100	150	200	300	450	475	475	475	475	475	475	475	475	475	--	--	--
Terrain 4	L1 (m)	75	100	125	175	250	350	475	475	475	475	475	475	475	475	475	--	--	--	--	--

Conductor	ACSR Mallard	AWG/kcmil :	795	D =	28.95	mm	w =	1.832	kg/m	RTS =	171.0	kN	Const. : 30/19	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	49.6	47.9	46.2	44.5	42.8	41.0	39.3	37.6	35.9	34.2	32.5	30.8	29.1	27.4	25.7	23.9	22.2	20.5	18.8	17.1
	H/w (m)	2759	2664	2569	2474	2379	2284	2188	2093	1998	1903	1808	1713	1618	1522	1427	1332	1237	1142	1047	951
	Pos_1 (m)	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.10	1.05
	Pos_2 (m)	1.55	1.55	1.50	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95	0.90
Terrain 1	L2 (m)	++	++	++	++	150	200	275	400	600	600	600	600	600	600	600	600	600	600	600	--
Terrain 2	L2 (m)	++	++	++	150	200	300	425	625	800	800	800	800	800	800	800	800	800	800	--	--
Terrain 3	L2 (m)	++	125	150	225	300	425	600	800	800	800	800	800	800	800	800	800	800	--	--	--
Terrain 4	L2 (m)	150	200	250	350	500	700	800	800	800	800	800	800	800	800	800	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Les Boules	AWG/kcmil :	865	D =	27.94	mm	w =	1.386	kg/m	RTS =	100.0	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**29.0**	**28.0**	**27.0**	**26.0**	**25.0**	**24.0**	**23.0**	**22.0**	**21.0**	**20.0**	**19.0**	**18.0**	**17.0**	**16.0**	**15.0**	**14.0**	**13.0**	**12.0**	**11.0**	**10.0**
	H/w (m)	2133	2059	1986	1912	1839	1765	1692	1618	1544	1471	1397	1324	1250	1177	1103	1030	956	883	809	735
	Pos_1 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.85
Terrain 1	**L1 (m)**	125	175	250	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	**L1 (m)**	200	275	375	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--
Terrain 3	**L1 (m)**	300	375	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--
Terrain 4	**L1 (m)**	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Les Boules	AWG/kcmil :	865	D =	27.94	mm	w =	1.386	kg/m	RTS =	100.0	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**29.0**	**28.0**	**27.0**	**26.0**	**25.0**	**24.0**	**23.0**	**22.0**	**21.0**	**20.0**	**19.0**	**18.0**	**17.0**	**16.0**	**15.0**	**14.0**	**13.0**	**12.0**	**11.0**	**10.0**
	H/w (m)	2133	2059	1986	1912	1839	1765	1692	1618	1544	1471	1397	1324	1250	1177	1103	1030	956	883	809	735
	Pos_1 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.90	0.85
	Pos_2 (m)	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.95	0.90	0.85	0.80	0.80
Terrain 1	**L2 (m)**	275	350	500	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	**L2 (m)**	400	550	750	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--
Terrain 3	**L2 (m)**	600	750	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--
Terrain 4	**L2 (m)**	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	875	D =	28.10	mm	w =	1.402	kg/m	RTS =	102.0	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**29.6**	**28.6**	**27.5**	**26.5**	**25.5**	**24.5**	**23.5**	**22.4**	**21.4**	**20.4**	**19.4**	**18.4**	**17.3**	**16.3**	**15.3**	**14.3**	**13.3**	**12.2**	**11.2**	**10.2**
	H/w (m)	2151	2077	2002	1928	1854	1780	1706	1632	1557	1483	1409	1335	1261	1187	1112	1038	964	890	816	742
	Pos_1 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90	0.90
Terrain 1	**L1 (m)**	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	**L1 (m)**	200	250	350	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--
Terrain 3	**L1 (m)**	275	375	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--
Terrain 4	**L1 (m)**	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	875	D =	28.10	mm	w =	1.402	kg/m	RTS =	102.0	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**29.6**	**28.6**	**27.5**	**26.5**	**25.5**	**24.5**	**23.5**	**22.4**	**21.4**	**20.4**	**19.4**	**18.4**	**17.3**	**16.3**	**15.3**	**14.3**	**13.3**	**12.2**	**11.2**	**10.2**
	H/w (m)	2151	2077	2002	1928	1854	1780	1706	1632	1557	1483	1409	1335	1261	1187	1112	1038	964	890	816	742
	Pos_1 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90	0.90
	Pos_2 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85	0.85	0.80
Terrain 1	**L2 (m)**	250	350	450	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	**L2 (m)**	375	525	700	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--
Terrain 3	**L2 (m)**	550	750	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--
Terrain 4	**L2 (m)**	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Crane	AWG/kcmil :	875	D =	29.10	mm	w =	1.674	kg/m	RTS =	140.0	kN	Const. : 54/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.6	39.2	37.8	36.4	35.0	33.6	32.2	30.8	29.4	28.0	26.6	25.2	23.8	22.4	21.0	19.6	18.2	16.8	15.4	14.0
	H/w (m)	2472	2387	2302	2217	2131	2046	1961	1876	1790	1705	1620	1535	1449	1364	1279	1194	1108	1023	938	853
	Pos_1 (m)	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	1.00
Terrain 1	L1 (m)	++	++	75	125	150	225	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	125	175	250	350	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--
Terrain 4	L1 (m)	175	225	300	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--

Conductor	ACSR Crane	AWG/kcmil :	875	D =	29.10	mm	w =	1.674	kg/m	RTS =	140.0	kN	Const. : 54/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.6	39.2	37.8	36.4	35.0	33.6	32.2	30.8	29.4	28.0	26.6	25.2	23.8	22.4	21.0	19.6	18.2	16.8	15.4	14.0
	H/w (m)	2472	2387	2302	2217	2131	2046	1961	1876	1790	1705	1620	1535	1449	1364	1279	1194	1108	1023	938	853
	Pos_1 (m)	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	1.00
	Pos_2 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90	0.90
Terrain 1	L2 (m)	++	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	150	175	250	350	475	675	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	200	275	350	500	700	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	325	450	600	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	900	D =	28.51	mm	w =	1.442	kg/m	RTS =	105.0	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.5	29.4	28.4	27.3	26.3	25.2	24.2	23.1	22.1	21.0	20.0	18.9	17.9	16.8	15.8	14.7	13.7	12.6	11.6	10.5
	H/w (m)	2153	2078	2004	1930	1856	1781	1707	1633	1559	1485	1410	1336	1262	1188	1113	1039	965	891	816	742
	Pos_1 (m)	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	1.00	0.95	0.90
Terrain 1	L1 (m)	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	200	250	350	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--
Terrain 3	L1 (m)	275	375	375	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--
Terrain 4	L1 (m)	375	375	375	375	375	375	375	375	375	375	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	900	D =	28.51	mm	w =	1.442	kg/m	RTS =	105.0	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	30.5	29.4	28.4	27.3	26.3	25.2	24.2	23.1	22.1	21.0	20.0	18.9	17.9	16.8	15.8	14.7	13.7	12.6	11.6	10.5
	H/w (m)	2153	2078	2004	1930	1856	1781	1707	1633	1559	1485	1410	1336	1262	1188	1113	1039	965	891	816	742
	Pos_1 (m)	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	1.00	0.95	0.90
	Pos_2 (m)	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.00	1.00	0.95	0.90	0.90	0.85	0.80
Terrain 1	L2 (m)	250	350	450	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	400	525	700	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--
Terrain 3	L2 (m)	550	750	750	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--
Terrain 4	L2 (m)	750	750	750	750	750	750	750	750	750	750	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Canary	AWG/kcmil :	900	D =	29.51	mm	w =	1.722	kg/m	RTS =	144.0	kN	Const. : 54/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**41.8**	**40.3**	**38.9**	**37.4**	**36.0**	**34.6**	**33.1**	**31.7**	**30.2**	**28.8**	**27.4**	**25.9**	**24.5**	**23.0**	**21.6**	**20.2**	**18.7**	**17.3**	**15.8**	**14.4**
	H/w (m)	2472	2387	2302	2216	2131	2046	1961	1875	1790	1705	1620	1534	1449	1364	1279	1193	1108	1023	938	852
	Pos_1 (m)	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00
Terrain 1	**L1 (m)**	++	75	75	125	150	225	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	**L1 (m)**	75	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	**L1 (m)**	100	125	175	250	350	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--
Terrain 4	**L1 (m)**	175	225	300	425	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--

Conductor	ACSR Canary	AWG/kcmil :	900	D =	29.51	mm	w =	1.722	kg/m	RTS =	144.0	kN	Const. : 54/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**41.8**	**40.3**	**38.9**	**37.4**	**36.0**	**34.6**	**33.1**	**31.7**	**30.2**	**28.8**	**27.4**	**25.9**	**24.5**	**23.0**	**21.6**	**20.2**	**18.7**	**17.3**	**15.8**	**14.4**
	H/w (m)	2472	2387	2302	2216	2131	2046	1961	1875	1790	1705	1620	1534	1449	1364	1279	1193	1108	1023	938	852
	Pos_1 (m)	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00
	Pos_2 (m)	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.05	1.00	1.00	0.95	0.90
Terrain 1	**L2 (m)**	++	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	**L2 (m)**	150	200	250	350	500	675	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	**L2 (m)**	200	275	375	500	700	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	**L2 (m)**	325	450	625	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

Conductor	ACSR Phoenix	AWG/kcmil :	954	D =	29.34	mm	w =	1.529	kg/m	RTS =	109.0	kN	Const. : 42/7	Vibration damper :	85545

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**31.6**	**30.5**	**29.4**	**28.3**	**27.3**	**26.2**	**25.1**	**24.0**	**22.9**	**21.8**	**20.7**	**19.6**	**18.5**	**17.4**	**16.4**	**15.3**	**14.2**	**13.1**	**12.0**	**10.9**
	H/w (m)	2107	2035	1962	1889	1817	1744	1671	1599	1526	1453	1381	1308	1235	1163	1090	1017	945	872	799	727
	Pos_1 (m)	1.55	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90
Terrain 1	**L1 (m)**	150	200	275	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	**L1 (m)**	250	325	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	**L1 (m)**	350	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--
Terrain 4	**L1 (m)**	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Phoenix	AWG/kcmil :	954	D =	29.34	mm	w =	1.529	kg/m	RTS =	109.0	kN	Const. : 42/7	Vibration damper :	85545

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**31.6**	**30.5**	**29.4**	**28.3**	**27.3**	**26.2**	**25.1**	**24.0**	**22.9**	**21.8**	**20.7**	**19.6**	**18.5**	**17.4**	**16.4**	**15.3**	**14.2**	**13.1**	**12.0**	**10.9**
	H/w (m)	2107	2035	1962	1889	1817	1744	1671	1599	1526	1453	1381	1308	1235	1163	1090	1017	945	872	799	727
	Pos_1 (m)	1.55	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90
	Pos_2 (m)	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.20	1.15	1.15	1.10	1.05	1.05	1.00	0.95	0.95	0.90	0.85	0.80
Terrain 1	**L2 (m)**	325	425	575	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	**L2 (m)**	475	650	775	775	775	775	775	775	775	775	775	775	775	775	--	--	--	--	--	--
Terrain 3	**L2 (m)**	675	775	775	775	775	775	775	775	775	775	775	775	775	--	--	--	--	--	--	--
Terrain 4	**L2 (m)**	775	775	775	775	775	775	775	775	775	775	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Cardinal	AWG/kcmil :	954	D =	30.38	mm	w =	1.825	kg/m	RTS =	152.0	kN	Const. : 54/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.1	42.6	41.0	39.5	38.0	36.5	35.0	33.4	31.9	30.4	28.9	27.4	25.8	24.3	22.8	21.3	19.8	18.2	16.7	15.2
	H/w (m)	2462	2377	2292	2207	2123	2038	1953	1868	1783	1698	1613	1528	1443	1358	1274	1189	1104	1019	934	849
	Pos_1 (m)	1.75	1.70	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.10	1.05	1.00
Terrain 1	L1 (m)	++	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	125	175	250	375	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	150	200	275	375	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--
Terrain 4	L1 (m)	175	250	325	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--

Conductor	ACSR Cardinal	AWG/kcmil :	954	D =	30.38	mm	w =	1.825	kg/m	RTS =	152.0	kN	Const. : 54/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.1	42.6	41.0	39.5	38.0	36.5	35.0	33.4	31.9	30.4	28.9	27.4	25.8	24.3	22.8	21.3	19.8	18.2	16.7	15.2
	H/w (m)	2462	2377	2292	2207	2123	2038	1953	1868	1783	1698	1613	1528	1443	1358	1274	1189	1104	1019	934	849
	Pos_1 (m)	1.75	1.70	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.10	1.05	1.00
	Pos_2 (m)	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90
Terrain 1	L2 (m)	++	125	175	250	350	475	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	150	200	275	375	525	725	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	225	275	400	525	750	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	350	475	650	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

Conductor	ACSR Carillon	AWG/kcmil :	1030	D =	30.48	mm	w =	1.648	kg/m	RTS =	118.0	kN	Const. : 42/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	34.2	33.0	31.9	30.7	29.5	28.3	27.1	26.0	24.8	23.6	22.4	21.2	20.1	18.9	17.7	16.5	15.3	14.2	13.0	11.8
	H/w (m)	2117	2044	1971	1898	1825	1752	1679	1606	1533	1460	1387	1314	1241	1168	1095	1022	949	876	803	730
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.10	1.05	1.00	0.95
Terrain 1	L1 (m)	150	200	275	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	250	325	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	350	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--
Terrain 4	L1 (m)	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Carillon	AWG/kcmil :	1030	D =	30.48	mm	w =	1.648	kg/m	RTS =	118.0	kN	Const. : 42/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	34.2	33.0	31.9	30.7	29.5	28.3	27.1	26.0	24.8	23.6	22.4	21.2	20.1	18.9	17.7	16.5	15.3	14.2	13.0	11.8
	H/w (m)	2117	2044	1971	1898	1825	1752	1679	1606	1533	1460	1387	1314	1241	1168	1095	1022	949	876	803	730
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.10	1.05	1.00	0.95
	Pos_2 (m)	1.45	1.45	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10	1.05	1.00	0.95	0.95	0.90	0.85
Terrain 1	L2 (m)	325	425	575	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	475	650	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	675	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Snowbird	AWG/kcmil :	1034	D =	30.56	mm	w =	1.657	kg/m	RTS =	118.0	kN	Const. : 42/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	34.2	33.0	31.9	30.7	29.5	28.3	27.1	26.0	24.8	23.6	22.4	21.2	20.1	18.9	17.7	16.5	15.3	14.2	13.0	11.8
	H/w (m)	2105	2033	1960	1887	1815	1742	1670	1597	1524	1452	1379	1307	1234	1161	1089	1016	944	871	799	726
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.10	1.05	1.00	0.95
Terrain 1	L1 (m)	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	250	325	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	350	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--
Terrain 4	L1 (m)	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Snowbird	AWG/kcmil :	1034	D =	30.56	mm	w =	1.657	kg/m	RTS =	118.0	kN	Const. : 42/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	34.2	33.0	31.9	30.7	29.5	28.3	27.1	26.0	24.8	23.6	22.4	21.2	20.1	18.9	17.7	16.5	15.3	14.2	13.0	11.8
	H/w (m)	2105	2033	1960	1887	1815	1742	1670	1597	1524	1452	1379	1307	1234	1161	1089	1016	944	871	799	726
	Pos_1 (m)	1.60	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.10	1.05	1.00	0.95
	Pos_2 (m)	1.45	1.45	1.40	1.35	1.35	1.30	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10	1.05	1.00	0.95	0.95	0.90	0.85
Terrain 1	L2 (m)	325	450	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	500	675	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	725	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Curlew	AWG/kcmil :	1034	D =	31.62	mm	w =	1.977	kg/m	RTS =	165.0	kN	Const. : 54/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	47.9	46.2	44.6	42.9	41.3	39.6	38.0	36.3	34.7	33.0	31.4	29.7	28.1	26.4	24.8	23.1	21.5	19.8	18.2	16.5
	H/w (m)	2467	2382	2297	2212	2127	2042	1957	1872	1787	1702	1616	1531	1446	1361	1276	1191	1106	1021	936	851
	Pos_1 (m)	1.80	1.75	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.05
Terrain 1	L1 (m)	++	75	100	125	175	250	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	150	200	275	375	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	150	200	275	375	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--
Terrain 4	L1 (m)	175	250	325	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--

Conductor	ACSR Curlew	AWG/kcmil :	1034	D =	31.62	mm	w =	1.977	kg/m	RTS =	165.0	kN	Const. : 54/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	47.9	46.2	44.6	42.9	41.3	39.6	38.0	36.3	34.7	33.0	31.4	29.7	28.1	26.4	24.8	23.1	21.5	19.8	18.2	16.5
	H/w (m)	2467	2382	2297	2212	2127	2042	1957	1872	1787	1702	1616	1531	1446	1361	1276	1191	1106	1021	936	851
	Pos_1 (m)	1.80	1.75	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.05
	Pos_2 (m)	1.65	1.60	1.55	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.15	1.10	1.05	1.00	0.95
Terrain 1	L2 (m)	++	150	175	250	350	500	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	150	200	275	375	525	750	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	225	300	400	550	750	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	350	500	675	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Beaumont	AWG/kcmil :	1113	D =	31.70	mm	w =	1.784	kg/m	RTS =	126.0	kN	Const. : 42/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.5	35.3	34.0	32.8	31.5	30.2	29.0	27.7	26.5	25.2	23.9	22.7	21.4	20.2	18.9	17.6	16.4	15.1	13.9	12.6
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05	1.05	1.00
Terrain 1	L1 (m)	175	250	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	275	375	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	400	425	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Beaumont	AWG/kcmil :	1113	D =	31.70	mm	w =	1.784	kg/m	RTS =	126.0	kN	Const. : 42/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	36.5	35.3	34.0	32.8	31.5	30.2	29.0	27.7	26.5	25.2	23.9	22.7	21.4	20.2	18.9	17.6	16.4	15.1	13.9	12.6
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05	1.05	1.00
	Pos_2 (m)	1.50	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90	0.90
Terrain 1	L2 (m)	375	500	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	550	750	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Finch	AWG/kcmil :	1113	D =	32.83	mm	w =	2.119	kg/m	RTS =	179.0	kN	Const. : 54/19	Vibration damper :	85866

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.9	50.1	48.3	46.5	44.8	43.0	41.2	39.4	37.6	35.8	34.0	32.2	30.4	28.6	26.9	25.1	23.3	21.5	19.7	17.9
	H/w (m)	2497	2411	2325	2239	2153	2067	1981	1894	1808	1722	1636	1550	1464	1378	1292	1206	1119	1033	947	861
	Pos_1 (m)	1.90	1.85	1.80	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
Terrain 1	L1 (m)	++	75	75	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	125	175	250	350	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--
Terrain 4	L1 (m)	175	225	300	425	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--

Conductor	ACSR Finch	AWG/kcmil :	1113	D =	32.83	mm	w =	2.119	kg/m	RTS =	179.0	kN	Const. : 54/19	Vibration damper :	85866

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.9	50.1	48.3	46.5	44.8	43.0	41.2	39.4	37.6	35.8	34.0	32.2	30.4	28.6	26.9	25.1	23.3	21.5	19.7	17.9
	H/w (m)	2497	2411	2325	2239	2153	2067	1981	1894	1808	1722	1636	1550	1464	1378	1292	1206	1119	1033	947	861
	Pos_1 (m)	1.90	1.85	1.80	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
	Pos_2 (m)	1.70	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00
Terrain 1	L2 (m)	++	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	150	200	250	350	500	700	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	200	275	375	500	700	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	325	450	625	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	1193	D =	32.81	mm	w =	1.911	kg/m	RTS =	135.0	kN	Const. :	42/7	Vibration damper :	85566

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	39.2	37.8	36.5	35.1	33.8	32.4	31.1	29.7	28.4	27.0	25.7	24.3	23.0	21.6	20.3	18.9	17.6	16.2	14.9	13.5
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.70	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05	1.00
Terrain 1	L1 (m)	200	250	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	300	375	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	425	425	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	425	425	425	425	425	425	425	425	425	425	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1193	D =	32.81	mm	w =	1.911	kg/m	RTS =	135.0	kN	Const. :	42/7	Vibration damper :	85566

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	39.2	37.8	36.5	35.1	33.8	32.4	31.1	29.7	28.4	27.0	25.7	24.3	23.0	21.6	20.3	18.9	17.6	16.2	14.9	13.5
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.70	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05	1.00
	Pos_2 (m)	1.55	1.50	1.50	1.45	1.45	1.40	1.40	1.35	1.30	1.30	1.25	1.20	1.20	1.15	1.10	1.10	1.05	1.00	0.95	0.90
Terrain 1	L2 (m)	375	500	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	575	775	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Grackle	AWG/kcmil :	1193	D =	33.98	mm	w =	2.270	kg/m	RTS =	192.0	kN	Const. :	54/19	Vibration damper :	85866

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	55.7	53.8	51.8	49.9	48.0	46.1	44.2	42.2	40.3	38.4	36.5	34.6	32.6	30.7	28.8	26.9	25.0	23.0	21.1	19.2
	H/w (m)	2500	2414	2328	2242	2155	2069	1983	1897	1811	1724	1638	1552	1466	1380	1293	1207	1121	1035	948	862
	Pos_1 (m)	1.95	1.90	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
Terrain 1	L1 (m)	++	75	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	75	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	100	150	200	250	375	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	L1 (m)	175	225	325	450	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--

Conductor	ACSR Grackle	AWG/kcmil :	1193	D =	33.98	mm	w =	2.270	kg/m	RTS =	192.0	kN	Const. :	54/19	Vibration damper :	85866

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	55.7	53.8	51.8	49.9	48.0	46.1	44.2	42.2	40.3	38.4	36.5	34.6	32.6	30.7	28.8	26.9	25.0	23.0	21.1	19.2
	H/w (m)	2500	2414	2328	2242	2155	2069	1983	1897	1811	1724	1638	1552	1466	1380	1293	1207	1121	1035	948	862
	Pos_1 (m)	1.95	1.90	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
	Pos_2 (m)	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.20	1.15	1.10	1.05
Terrain 1	L2 (m)	++	125	175	250	325	475	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	150	200	275	375	500	725	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	200	275	375	525	725	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	350	475	625	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Scissortail	AWG/kcmil :	1272	D =	33.89	mm	w =	2.039	kg/m	RTS =	144.0	kN	Const. : 42/7	Vibration damper :	85866

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	41.8	40.3	38.9	37.4	36.0	34.6	33.1	31.7	30.2	28.8	27.4	25.9	24.5	23.0	21.6	20.2	18.7	17.3	15.8	14.4
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.80	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05
Terrain 1	L1 (m)	200	250	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	300	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	425	450	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	450	450	450	450	450	450	450	450	450	450	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Scissortail	AWG/kcmil :	1272	D =	33.89	mm	w =	2.039	kg/m	RTS =	144.0	kN	Const. : 42/7	Vibration damper :	85866

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	41.8	40.3	38.9	37.4	36.0	34.6	33.1	31.7	30.2	28.8	27.4	25.9	24.5	23.0	21.6	20.2	18.7	17.3	15.8	14.4
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.80	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05
	Pos_2 (m)	1.60	1.55	1.55	1.50	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.05	1.00	0.95
Terrain 1	L2 (m)	400	525	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	600	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Pheasant	AWG/kcmil :	1272	D =	35.09	mm	w =	2.421	kg/m	RTS =	200.0	kN	Const. : 54/19	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	58.0	56.0	54.0	52.0	50.0	48.0	46.0	44.0	42.0	40.0	38.0	36.0	34.0	32.0	30.0	28.0	26.0	24.0	22.0	20.0
	H/w (m)	2442	2358	2274	2189	2105	2021	1937	1853	1768	1684	1600	1516	1432	1347	1263	1179	1095	1011	926	842
	Pos_1 (m)	2.00	1.95	1.90	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.15
Terrain 1	L1 (m)	++	75	100	150	200	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	100	125	175	225	325	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	125	175	250	325	450	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	L1 (m)	225	300	400	525	525	525	525	525	525	525	525	525	525	--	--	--	--	--	--	--

Conductor	ACSR Pheasant	AWG/kcmil :	1272	D =	35.09	mm	w =	2.421	kg/m	RTS =	200.0	kN	Const. : 54/19	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	58.0	56.0	54.0	52.0	50.0	48.0	46.0	44.0	42.0	40.0	38.0	36.0	34.0	32.0	30.0	28.0	26.0	24.0	22.0	20.0
	H/w (m)	2442	2358	2274	2189	2105	2021	1937	1853	1768	1684	1600	1516	1432	1347	1263	1179	1095	1011	926	842
	Pos_1 (m)	2.00	1.95	1.90	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.15
	Pos_2 (m)	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.10	1.05
Terrain 1	L2 (m)	125	175	225	300	425	575	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	175	250	325	450	650	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	250	350	475	650	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	425	600	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	1352	D =	34.94	mm	w =	2.166	kg/m	RTS =	153.0	kN	Const. :	42/7	Vibration damper :	85866

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.4	42.8	41.3	39.8	38.3	36.7	35.2	33.7	32.1	30.6	29.1	27.5	26.0	24.5	23.0	21.4	19.9	18.4	16.8	15.3
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.85	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10
Terrain 1	L1 (m)	200	275	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	300	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	450	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1352	D =	34.94	mm	w =	2.166	kg/m	RTS =	153.0	kN	Const. :	42/7	Vibration damper :	85866

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.4	42.8	41.3	39.8	38.3	36.7	35.2	33.7	32.1	30.6	29.1	27.5	26.0	24.5	23.0	21.4	19.9	18.4	16.8	15.3
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.85	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10
	Pos_2 (m)	1.65	1.60	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	0.95
Terrain 1	L2 (m)	400	550	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	625	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Martin	AWG/kcmil :	1352	D =	36.16	mm	w =	2.572	kg/m	RTS =	212.0	kN	Const. :	54/19	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	61.5	59.4	57.2	55.1	53.0	50.9	48.8	46.6	44.5	42.4	40.3	38.2	36.0	33.9	31.8	29.7	27.6	25.4	23.3	21.2
	H/w (m)	2437	2353	2269	2185	2101	2017	1933	1848	1764	1680	1596	1512	1428	1344	1260	1176	1092	1008	924	840
	Pos_1 (m)	2.05	2.00	2.00	1.95	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.50	1.45	1.35	1.30	1.25	1.20
Terrain 1	L1 (m)	75	75	125	150	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	100	125	175	250	325	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	150	175	250	350	475	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	L1 (m)	225	300	425	525	525	525	525	525	525	525	525	525	525	--	--	--	--	--	--	--

Conductor	ACSR Martin	AWG/kcmil :	1352	D =	36.16	mm	w =	2.572	kg/m	RTS =	212.0	kN	Const. :	54/19	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	61.5	59.4	57.2	55.1	53.0	50.9	48.8	46.6	44.5	42.4	40.3	38.2	36.0	33.9	31.8	29.7	27.6	25.4	23.3	21.2
	H/w (m)	2437	2353	2269	2185	2101	2017	1933	1848	1764	1680	1596	1512	1428	1344	1260	1176	1092	1008	924	840
	Pos_1 (m)	2.05	2.00	2.00	1.95	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.50	1.45	1.35	1.30	1.25	1.20
	Pos_2 (m)	1.85	1.80	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.10
Terrain 1	L2 (m)	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	200	250	350	475	675	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	275	375	500	700	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	450	625	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Bersimis	AWG/kcmil :	1361	D =	35.01	mm	w =	2.181	kg/m	RTS =	154.0	kN	Const. : 42/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.7	43.1	41.6	40.0	38.5	37.0	35.4	33.9	32.3	30.8	29.3	27.7	26.2	24.6	23.1	21.6	20.0	18.5	16.9	15.4
	H/w (m)	2087	2015	1943	1871	1799	1727	1655	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.85	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10
Terrain 1	L1 (m)	200	275	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	300	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	450	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Bersimis	AWG/kcmil :	1361	D =	35.01	mm	w =	2.181	kg/m	RTS =	154.0	kN	Const. : 42/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	44.7	43.1	41.6	40.0	38.5	37.0	35.4	33.9	32.3	30.8	29.3	27.7	26.2	24.6	23.1	21.6	20.0	18.5	16.9	15.4
	H/w (m)	2087	2015	1943	1871	1799	1727	1655	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.85	1.80	1.75	1.75	1.70	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10
	Pos_2 (m)	1.65	1.65	1.60	1.55	1.55	1.50	1.45	1.45	1.40	1.35	1.35	1.30	1.25	1.25	1.20	1.15	1.10	1.05	1.00	0.95
Terrain 1	L2 (m)	400	550	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	625	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Bersfort	AWG/kcmil :	1361	D =	35.56	mm	w =	2.369	kg/m	RTS =	180.0	kN	Const. : 48/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	52.2	50.4	48.6	46.8	45.0	43.2	41.4	39.6	37.8	36.0	34.2	32.4	30.6	28.8	27.0	25.2	23.4	21.6	19.8	18.0
	H/w (m)	2246	2169	2091	2014	1936	1859	1781	1704	1627	1549	1472	1394	1317	1239	1162	1084	1007	929	852	775
	Pos_1 (m)	1.95	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
Terrain 1	L1 (m)	125	150	225	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	175	250	325	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 3	L1 (m)	250	350	475	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--
Terrain 4	L1 (m)	425	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--	--

Conductor	ACSR Bersfort	AWG/kcmil :	1361	D =	35.56	mm	w =	2.369	kg/m	RTS =	180.0	kN	Const. : 48/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	52.2	50.4	48.6	46.8	45.0	43.2	41.4	39.6	37.8	36.0	34.2	32.4	30.6	28.8	27.0	25.2	23.4	21.6	19.8	18.0
	H/w (m)	2246	2169	2091	2014	1936	1859	1781	1704	1627	1549	1472	1394	1317	1239	1162	1084	1007	929	852	775
	Pos_1 (m)	1.95	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
	Pos_2 (m)	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.35	1.30	1.25	1.20	1.15	1.10	1.05	1.00
Terrain 1	L2 (m)	250	325	425	575	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	350	475	650	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 3	L2 (m)	500	700	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	1431	D =	35.95	mm	w =	2.294	kg/m	RTS =	162.0	kN	Const. : 42/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	47.0	45.4	43.7	42.1	40.5	38.9	37.3	35.6	34.0	32.4	30.8	29.2	27.5	25.9	24.3	22.7	21.1	19.4	17.8	16.2
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.90	1.85	1.80	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
Terrain 1	L1 (m)	200	275	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	325	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	450	475	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	475	475	475	475	475	475	475	475	475	475	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1431	D =	35.95	mm	w =	2.294	kg/m	RTS =	162.0	kN	Const. : 42/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	47.0	45.4	43.7	42.1	40.5	38.9	37.3	35.6	34.0	32.4	30.8	29.2	27.5	25.9	24.3	22.7	21.1	19.4	17.8	16.2
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.90	1.85	1.80	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
	Pos_2 (m)	1.70	1.65	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.20	1.15	1.10	1.05	1.00
Terrain 1	L2 (m)	425	550	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	625	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Plover	AWG/kcmil :	1431	D =	37.22	mm	w =	2.724	kg/m	RTS =	225.0	kN	Const. : 54/19	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	65.3	63.0	60.8	58.5	56.3	54.0	51.8	49.5	47.3	45.0	42.8	40.5	38.3	36.0	33.8	31.5	29.3	27.0	24.8	22.5
	H/w (m)	2442	2358	2273	2189	2105	2021	1937	1852	1768	1684	1600	1516	1431	1347	1263	1179	1095	1010	926	842
	Pos_1 (m)	2.10	2.10	2.05	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25
Terrain 1	L1 (m)	75	100	125	150	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	150	175	250	350	475	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	L1 (m)	225	300	425	550	550	550	550	550	550	550	550	550	550	--	--	--	--	--	--	--

Conductor	ACSR Plover	AWG/kcmil :	1431	D =	37.22	mm	w =	2.724	kg/m	RTS =	225.0	kN	Const. : 54/19	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	65.3	63.0	60.8	58.5	56.3	54.0	51.8	49.5	47.3	45.0	42.8	40.5	38.3	36.0	33.8	31.5	29.3	27.0	24.8	22.5
	H/w (m)	2442	2358	2273	2189	2105	2021	1937	1852	1768	1684	1600	1516	1431	1347	1263	1179	1095	1010	926	842
	Pos_1 (m)	2.10	2.10	2.05	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25
	Pos_2 (m)	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
Terrain 1	L2 (m)	125	175	225	325	450	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	200	275	350	500	675	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	275	375	500	700	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	450	625	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	1511	D =	36.92	mm	w =	2.421	kg/m	RTS =	171.0	kN	Const. :	42/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	49.6	47.9	46.2	44.5	42.8	41.0	39.3	37.6	35.9	34.2	32.5	30.8	29.1	27.4	25.7	23.9	22.2	20.5	18.8	17.1
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.95	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
Terrain 1	L1 (m)	225	275	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	325	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	475	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1511	D =	36.92	mm	w =	2.421	kg/m	RTS =	171.0	kN	Const. :	42/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	49.6	47.9	46.2	44.5	42.8	41.0	39.3	37.6	35.9	34.2	32.5	30.8	29.1	27.4	25.7	23.9	22.2	20.5	18.8	17.1
	H/w (m)	2088	2016	1944	1872	1800	1728	1656	1584	1512	1440	1368	1296	1224	1152	1080	1008	936	864	792	720
	Pos_1 (m)	1.95	1.90	1.85	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
	Pos_2 (m)	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.10	1.05
Terrain 1	L2 (m)	425	575	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	650	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR Parrot	AWG/kcmil :	1511	D =	38.22	mm	w =	2.874	kg/m	RTS =	237.0	kN	Const. :	54/19	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	68.7	66.4	64.0	61.6	59.3	56.9	54.5	52.1	49.8	47.4	45.0	42.7	40.3	37.9	35.6	33.2	30.8	28.4	26.1	23.7
	H/w (m)	2438	2354	2270	2186	2102	2017	1933	1849	1765	1681	1597	1513	1429	1345	1261	1177	1093	1009	925	841
	Pos_1 (m)	2.15	2.15	2.10	2.05	2.00	1.95	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.25
Terrain 1	L1 (m)	75	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	L1 (m)	100	125	175	250	350	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	150	200	275	375	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	L1 (m)	250	325	450	575	575	575	575	575	575	575	575	575	575	--	--	--	--	--	--	--

Conductor	ACSR Parrot	AWG/kcmil :	1511	D =	38.22	mm	w =	2.874	kg/m	RTS =	237.0	kN	Const. :	54/19	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	68.7	66.4	64.0	61.6	59.3	56.9	54.5	52.1	49.8	47.4	45.0	42.7	40.3	37.9	35.6	33.2	30.8	28.4	26.1	23.7
	H/w (m)	2438	2354	2270	2186	2102	2017	1933	1849	1765	1681	1597	1513	1429	1345	1261	1177	1093	1009	925	841
	Pos_1 (m)	2.15	2.15	2.10	2.05	2.00	1.95	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.25
	Pos_2 (m)	1.95	1.90	1.90	1.85	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15
Terrain 1	L2 (m)	125	175	250	325	475	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	L2 (m)	200	275	375	500	700	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	300	400	525	725	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	L2 (m)	475	650	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR	AWG/kcmil :	1570	D =	37.75	mm	w =	2.499	kg/m	RTS =	176.0	kN	Const. :	72/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.0	49.3	47.5	45.8	44.0	42.2	40.5	38.7	37.0	35.2	33.4	31.7	29.9	28.2	26.4	24.6	22.9	21.1	19.4	17.6
	H/w (m)	2082	2010	1938	1867	1795	1723	1651	1579	1508	1436	1364	1292	1220	1149	1077	1005	933	862	790	718
	Pos_1 (m)	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.40	1.35	1.25	1.20	1.15
Terrain 1	L1 (m)	225	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--	--
Terrain 2	L1 (m)	325	400	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--	--
Terrain 3	L1 (m)	475	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1570	D =	37.75	mm	w =	2.499	kg/m	RTS =	176.0	kN	Const. :	72/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.0	49.3	47.5	45.8	44.0	42.2	40.5	38.7	37.0	35.2	33.4	31.7	29.9	28.2	26.4	24.6	22.9	21.1	19.4	17.6
	H/w (m)	2082	2010	1938	1867	1795	1723	1651	1579	1508	1436	1364	1292	1220	1149	1077	1005	933	862	790	718
	Pos_1 (m)	2.00	1.95	1.90	1.90	1.85	1.80	1.75	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.40	1.35	1.25	1.20	1.15
	Pos_2 (m)	1.80	1.75	1.70	1.70	1.65	1.60	1.60	1.55	1.50	1.50	1.45	1.40	1.35	1.30	1.30	1.25	1.20	1.15	1.10	1.05
Terrain 1	L2 (m)	450	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--	--
Terrain 2	L2 (m)	675	800	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 3	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1570	D =	38.53	mm	w =	2.780	kg/m	RTS =	212.0	kN	Const. :	48/7	Vibration damper :	85867

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	61.5	59.4	57.2	55.1	53.0	50.9	48.8	46.6	44.5	42.4	40.3	38.2	36.0	33.9	31.8	29.7	27.6	25.4	23.3	21.2
	H/w (m)	2254	2177	2099	2021	1943	1866	1788	1710	1632	1555	1477	1399	1322	1244	1166	1088	1011	933	855	777
	Pos_1 (m)	2.10	2.05	2.05	2.00	1.95	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25
Terrain 1	L1 (m)	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	200	250	350	400	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--	--
Terrain 3	L1 (m)	275	350	500	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--	--
Terrain 4	L1 (m)	450	550	550	550	550	550	550	550	550	550	550	--	--	--	--	--	--	--	--	--

Conductor	ACSR	AWG/kcmil :	1570	D =	38.53	mm	w =	2.780	kg/m	RTS =	212.0	kN	Const. :	48/7	Vibration damper :	85867

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	61.5	59.4	57.2	55.1	53.0	50.9	48.8	46.6	44.5	42.4	40.3	38.2	36.0	33.9	31.8	29.7	27.6	25.4	23.3	21.2
	H/w (m)	2254	2177	2099	2021	1943	1866	1788	1710	1632	1555	1477	1399	1322	1244	1166	1088	1011	933	855	777
	Pos_1 (m)	2.10	2.05	2.05	2.00	1.95	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25
	Pos_2 (m)	1.90	1.85	1.85	1.80	1.75	1.70	1.70	1.65	1.60	1.55	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10
Terrain 1	L2 (m)	250	325	450	600	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	375	500	675	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 3	L2 (m)	550	725	800	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--
Terrain 4	L2 (m)	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
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TABLE III : APPLICATION GUIDE FOR LISTED CONDUCTORS

Conductor	ACSR Falcon	AWG/kcmil :	1570	D =	39.23	mm	w =	3.027	kg/m	RTS =	250.0	kN	Const. : 54/19	Vibration damper :	85867

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**72.5**	**70.0**	**67.5**	**65.0**	**62.5**	**60.0**	**57.5**	**55.0**	**52.5**	**50.0**	**47.5**	**45.0**	**42.5**	**40.0**	**37.5**	**35.0**	**32.5**	**30.0**	**27.5**	**25.0**
	H/w (m)	2441	2357	2273	2189	2105	2021	1936	1852	1768	1684	1600	1515	1431	1347	1263	1179	1094	1010	926	842
	Pos_1 (m)	2.25	2.20	2.15	2.10	2.05	2.05	2.00	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.35	1.30
Terrain 1	**L1 (m)**	75	100	125	175	225	300	300	300	300	300	300	300	300	300	300	300	300	300	--	--
Terrain 2	**L1 (m)**	100	150	200	250	350	400	400	400	400	400	400	400	400	400	400	400	--	--	--	--
Terrain 3	**L1 (m)**	150	200	275	375	500	500	500	500	500	500	500	500	500	500	500	--	--	--	--	--
Terrain 4	**L1 (m)**	250	325	450	575	575	575	575	575	575	575	575	575	575	--	--	--	--	--	--	--

Conductor	ACSR Falcon	AWG/kcmil :	1570	D =	39.23	mm	w =	3.027	kg/m	RTS =	250.0	kN	Const. : 54/19	Vibration damper :	85867

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**72.5**	**70.0**	**67.5**	**65.0**	**62.5**	**60.0**	**57.5**	**55.0**	**52.5**	**50.0**	**47.5**	**45.0**	**42.5**	**40.0**	**37.5**	**35.0**	**32.5**	**30.0**	**27.5**	**25.0**
	H/w (m)	2441	2357	2273	2189	2105	2021	1936	1852	1768	1684	1600	1515	1431	1347	1263	1179	1094	1010	926	842
	Pos_1 (m)	2.25	2.20	2.15	2.10	2.05	2.05	2.00	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.35	1.30
	Pos_2 (m)	2.00	1.95	1.95	1.90	1.85	1.85	1.80	1.75	1.70	1.65	1.60	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20
Terrain 1	**L2 (m)**	150	175	250	350	475	600	600	600	600	600	600	600	600	600	600	600	600	600	--	--
Terrain 2	**L2 (m)**	200	275	375	525	725	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--
Terrain 3	**L2 (m)**	300	400	525	750	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--
Terrain 4	**L2 (m)**	475	650	800	800	800	800	800	800	800	800	800	800	800	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

APPENDIX 4

TABLE VI – APPLICATION GUIDE FOR LISTED GROUND WIRES

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE IV : APPLICATION GUIDE FOR LISTED GROUND WIRES

Ground wire	Steel 3/8"	Grade	160	D =	9.1	mm	w =	0.402	kg/m	RTS =	53.4	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	15.5	15.0	14.4	13.9	13.4	12.8	12.3	11.7	11.2	10.7	10.1	9.6	9.1	8.5	8.0	7.5	6.9	6.4	5.9	5.3
	H/w (m)	3927	3791	3656	3521	3385	3250	3114	2979	2844	2708	2573	2437	2302	2167	2031	1896	1760	1625	1489	1354
	Pos_1 (m)	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.45	0.40	0.40	0.40
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	75	125	225	300	300	300	--	--	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	++	75	150	275	325	325	325	--	--	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	++	100	175	300	325	325	--	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	++	75	125	250	325	325	--	--	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 3/8"	Grade	160	D =	9.1	mm	w =	0.402	kg/m	RTS =	53.4	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	15.5	15.0	14.4	13.9	13.4	12.8	12.3	11.7	11.2	10.7	10.1	9.6	9.1	8.5	8.0	7.5	6.9	6.4	5.9	5.3
	H/w (m)	3927	3791	3656	3521	3385	3250	3114	2979	2844	2708	2573	2437	2302	2167	2031	1896	1760	1625	1489	1354
	Pos_1 (m)	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.45	0.40	0.40	0.40
	Pos_2 (m)	0.60	0.60	0.55	0.55	0.55	0.55	0.55	0.50	0.50	0.50	0.50	0.45	0.45	0.45	0.40	0.40	0.40	0.40	0.35	0.35
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	++	100	150	250	475	600	600	600	--	--	--	--
Terrain 2	L2 (m)	++	++	++	++	++	++	++	100	175	300	525	675	675	675	--	--	--	--	--	--
Terrain 3	L2 (m)	++	++	++	++	75	100	175	325	625	675	675	--	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	++	++	75	150	250	475	675	675	--	--	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 3/8"	Grade	180	D =	9.1	mm	w =	0.402	kg/m	RTS =	60.0	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	17.4	16.8	16.2	15.6	15.0	14.4	13.8	13.2	12.6	12.0	11.4	10.8	10.2	9.6	9.0	8.4	7.8	7.2	6.6	6.0
	H/w (m)	4412	4260	4108	3956	3804	3651	3499	3347	3195	3043	2891	2739	2586	2434	2282	2130	1978	1826	1674	1521
	Pos_1 (m)	0.70	0.70	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.45	0.40
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	++	75	125	250	300	300	--	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	++	++	++	75	125	250	325	325	--	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	++	++	++	75	125	250	325	325	--	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	++	++	++	++	75	150	300	325	325	--	--	--	--	--	--	--	--	--

Ground wire	Steel 3/8"	Grade	180	D =	9.1	mm	w =	0.402	kg/m	RTS =	60.0	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	17.4	16.8	16.2	15.6	15.0	14.4	13.8	13.2	12.6	12.0	11.4	10.8	10.2	9.6	9.0	8.4	7.8	7.2	6.6	6.0
	H/w (m)	4412	4260	4108	3956	3804	3651	3499	3347	3195	3043	2891	2739	2586	2434	2282	2130	1978	1826	1674	1521
	Pos_1 (m)	0.70	0.70	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.45	0.40
	Pos_2 (m)	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.55	0.50	0.50	0.50	0.50	0.45	0.45	0.45	0.40	0.40	0.40	0.35
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	++	++	++	75	150	275	500	600	600	--	--	--
Terrain 2	L2 (m)	++	++	++	++	++	++	++	++	++	75	150	250	500	675	675	--	--	--	--	--
Terrain 3	L2 (m)	++	++	++	++	++	++	++	75	125	250	500	675	675	--	--	--	--	--	--	--
Terrain 4	L2 (m)	++	++	++	++	++	75	150	300	600	675	675	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
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TABLE IV : APPLICATION GUIDE FOR LISTED GROUND WIRES

Ground wire	Steel 7/16"	Grade	160	D =	11.0	mm	w =	0.577	kg/m	RTS =	76.9	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**22.3**	**21.5**	**20.8**	**20.0**	**19.2**	**18.5**	**17.7**	**16.9**	**16.1**	**15.4**	**14.6**	**13.8**	**13.1**	**12.3**	**11.5**	**10.8**	**10.0**	**9.2**	**8.5**	**7.7**
	H/w (m)	3940	3804	3668	3532	3396	3261	3125	2989	2853	2717	2581	2445	2310	2174	2038	1902	1766	1630	1494	1359
	Pos_1 (m)	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.45
Terrain 1	**L1 (m)**	++	++	++	++	++	++	++	++	++	++	75	150	275	300	300	300	--	--	--	--
Terrain 2	**L1 (m)**	++	++	++	++	++	++	++	++	100	175	300	400	400	400	--	--	--	--	--	--
Terrain 3	**L1 (m)**	++	++	++	++	++	++	100	200	350	400	400	--	--	--	--	--	--	--	--	--
Terrain 4	**L1 (m)**	++	++	++	75	150	275	400	400	400	--	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 7/16"	Grade	160	D =	11.0	mm	w =	0.577	kg/m	RTS =	76.9	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**22.3**	**21.5**	**20.8**	**20.0**	**19.2**	**18.5**	**17.7**	**16.9**	**16.1**	**15.4**	**14.6**	**13.8**	**13.1**	**12.3**	**11.5**	**10.8**	**10.0**	**9.2**	**8.5**	**7.7**
	H/w (m)	3940	3804	3668	3532	3396	3261	3125	2989	2853	2717	2581	2445	2310	2174	2038	1902	1766	1630	1494	1359
	Pos_1 (m)	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.45
	Pos_2 (m)	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.40
Terrain 1	**L2 (m)**	++	++	++	++	++	++	++	++	++	100	175	300	550	600	600	600	--	--	--	--
Terrain 2	**L2 (m)**	++	++	++	++	++	++	75	100	200	325	625	775	775	775	--	--	--	--	--	--
Terrain 3	**L2 (m)**	++	++	++	++	75	125	225	375	700	775	775	--	--	--	--	--	--	--	--	--
Terrain 4	**L2 (m)**	++	++	100	175	300	550	775	775	775	--	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 7/16"	Grade	180	D =	11.0	mm	w =	0.577	kg/m	RTS =	86.7	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**25.1**	**24.3**	**23.4**	**22.5**	**21.7**	**20.8**	**19.9**	**19.1**	**18.2**	**17.3**	**16.5**	**15.6**	**14.7**	**13.9**	**13.0**	**12.1**	**11.3**	**10.4**	**9.5**	**8.7**
	H/w (m)	4442	4289	4136	3982	3829	3676	3523	3370	3217	3063	2910	2757	2604	2451	2298	2144	1991	1838	1685	1532
	Pos_1 (m)	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50	0.50
Terrain 1	**L1 (m)**	++	++	++	++	++	++	++	++	++	++	++	++	75	150	275	300	300	--	--	--
Terrain 2	**L1 (m)**	++	++	++	++	++	++	++	++	++	++	75	150	275	400	400	--	--	--	--	--
Terrain 3	**L1 (m)**	++	++	++	++	++	++	++	++	75	150	275	400	400	400	--	--	--	--	--	--
Terrain 4	**L1 (m)**	++	++	++	++	++	++	75	175	325	400	400	--	--	--	--	--	--	--	--	--

Ground wire	Steel 7/16"	Grade	180	D =	11.0	mm	w =	0.577	kg/m	RTS =	86.7	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
	H (kN)	**25.1**	**24.3**	**23.4**	**22.5**	**21.7**	**20.8**	**19.9**	**19.1**	**18.2**	**17.3**	**16.5**	**15.6**	**14.7**	**13.9**	**13.0**	**12.1**	**11.3**	**10.4**	**9.5**	**8.7**
	H/w (m)	4442	4289	4136	3982	3829	3676	3523	3370	3217	3063	2910	2757	2604	2451	2298	2144	1991	1838	1685	1532
	Pos_1 (m)	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50	0.50
	Pos_2 (m)	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.45	0.45
Terrain 1	**L2 (m)**	++	++	++	++	++	++	++	++	++	++	++	100	150	300	575	600	600	--	--	--
Terrain 2	**L2 (m)**	++	++	++	++	++	++	++	++	++	75	150	275	550	775	775	--	--	--	--	--
Terrain 3	**L2 (m)**	++	++	++	++	++	++	++	75	150	275	550	775	775	775	--	--	--	--	--	--
Terrain 4	**L2 (m)**	++	++	++	++	++	100	175	325	650	775	775	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

HELIX / HYDRO-QUÉBEC VIBRATION DAMPERS
APPLICATION GUIDE

TABLE IV : APPLICATION GUIDE FOR LISTED GROUND WIRES

Ground wire	Steel 1/2"	Grade	160	D =	12.7	mm	w =	0.759	kg/m	RTS =	101.0	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.3	28.3	27.3	26.3	25.3	24.2	23.2	22.2	21.2	20.2	19.2	18.2	17.2	16.2	15.2	14.1	13.1	12.1	11.1	10.1
	H/w (m)	3934	3798	3662	3527	3391	3256	3120	2984	2849	2713	2577	2442	2306	2170	2035	1899	1763	1628	1492	1356
	Pos_1 (m)	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	100	175	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	75	100	200	350	400	400	400	400	--	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	75	125	225	400	450	450	450	450	--	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	++	100	175	325	450	450	450	450	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 1/2"	Grade	160	D =	12.7	mm	w =	0.759	kg/m	RTS =	101.0	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	29.3	28.3	27.3	26.3	25.3	24.2	23.2	22.2	21.2	20.2	19.2	18.2	17.2	16.2	15.2	14.1	13.1	12.1	11.1	10.1
	H/w (m)	3934	3798	3662	3527	3391	3256	3120	2984	2849	2713	2577	2442	2306	2170	2035	1899	1763	1628	1492	1356
	Pos_1 (m)	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.60	0.60	0.55	0.55
	Pos_2 (m)	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.55	0.50	0.50
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	75	125	200	350	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	++	++	++	++	++	++	75	125	225	400	700	800	800	800	800	--	--	--	--	--
Terrain 3	L2 (m)	++	++	++	++	75	150	250	450	800	800	800	800	800	--	--	--	--	--	--	--
Terrain 4	L2 (m)	++	75	100	200	350	625	800	800	800	800	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 1/2"	Grade	180	D =	12.7	mm	w =	0.759	kg/m	RTS =	113.6	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	32.9	31.8	30.7	29.5	28.4	27.3	26.1	25.0	23.9	22.7	21.6	20.4	19.3	18.2	17.0	15.9	14.8	13.6	12.5	11.4
	H/w (m)	4425	4272	4119	3967	3814	3662	3509	3357	3204	3051	2899	2746	2594	2441	2289	2136	1983	1831	1678	1526
	Pos_1 (m)	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	++	100	175	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	++	++	++	100	175	325	400	400	400	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	++	++	++	75	175	325	450	450	450	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	++	++	++	++	100	200	400	450	450	450	--	--	--	--	--	--	--	--

Ground wire	Steel 1/2"	Grade	180	D =	12.7	mm	w =	0.759	kg/m	RTS =	113.6	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	32.9	31.8	30.7	29.5	28.4	27.3	26.1	25.0	23.9	22.7	21.6	20.4	19.3	18.2	17.0	15.9	14.8	13.6	12.5	11.4
	H/w (m)	4425	4272	4119	3967	3814	3662	3509	3357	3204	3051	2899	2746	2594	2441	2289	2136	1983	1831	1678	1526
	Pos_1 (m)	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55
	Pos_2 (m)	0.85	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.65	0.65	0.65	0.60	0.60	0.55	0.55	0.50
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	++	++	++	100	175	350	600	600	600	600	--	--
Terrain 2	L2 (m)	++	++	++	++	++	++	++	++	++	100	175	350	650	800	800	800	--	--	--	--
Terrain 3	L2 (m)	++	++	++	++	++	++	++	100	175	325	650	800	800	800	--	--	--	--	--	--
Terrain 4	L2 (m)	++	++	++	++	++	100	200	400	800	800	800	800	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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TABLE IV : APPLICATION GUIDE FOR LISTED GROUND WIRES

Ground wire	Steel 1/2"	Grade	220	D =	12.7	mm	w =	0.759	kg/m	RTS =	138.8	kN	Vibration damper :	87422

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.7	33.3	31.9	30.5	29.1	27.8	26.4	25.0	23.6	22.2	20.8	19.4	18.0	16.7	15.3	13.9
	H/w (m)	5406	5220	5033	4847	4660	4474	4288	4101	3915	3728	3542	3355	3169	2983	2796	2610	2423	2237	2051	1864
	Pos_1 (m)	1.05	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	100	175	300	300	300
Terrain 2	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	++	++	75	150	300	400	400	400	--
Terrain 3	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	++	100	225	450	450	450	--	--	--
Terrain 4	L1 (m)	++	++	++	++	++	++	++	++	++	++	100	200	450	450	450	--	--	--	--	--

Ground wire	Steel 1/2"	Grade	220	D =	12.7	mm	w =	0.759	kg/m	RTS =	138.8	kN	Vibration damper :	87422

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	40.3	38.9	37.5	36.1	34.7	33.3	31.9	30.5	29.1	27.8	26.4	25.0	23.6	22.2	20.8	19.4	18.0	16.7	15.3	13.9
	H/w (m)	5406	5220	5033	4847	4660	4474	4288	4101	3915	3728	3542	3355	3169	2983	2796	2610	2423	2237	2051	1864
	Pos_1 (m)	1.05	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65
	Pos_2 (m)	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60	0.60	0.55
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	++	++	++	++	++	++	75	175	375	600	600	600
Terrain 2	L2 (m)	++	++	++	++	++	++	++	++	++	++	++	++	75	125	275	625	800	800	800	--
Terrain 3	L2 (m)	++	++	++	++	++	++	++	++	++	++	++	100	200	450	800	800	800	--	--	--
Terrain 4	L2 (m)	++	++	++	++	++	++	++	++	++	75	175	400	800	800	800	--	--	--	--	--

Ground wire	Steel 5/8"	Grade	160	D =	15.8	mm	w =	1.210	kg/m	RTS =	159.7	kN	Vibration damper :	85523

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	46.3	44.7	43.1	41.5	39.9	38.3	36.7	35.1	33.5	31.9	30.3	28.7	27.1	25.6	24.0	22.4	20.8	19.2	17.6	16.0
	H/w (m)	3902	3767	3633	3498	3363	3229	3094	2960	2825	2691	2556	2422	2287	2153	2018	1884	1749	1614	1480	1345
	Pos_1 (m)	1.15	1.10	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	75	150	250	300	300	300	300	300	--	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	100	150	275	400	400	400	400	400	--	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	100	175	325	500	500	500	500	--	--	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	75	150	250	450	575	575	575	--	--	--	--	--	--	--	--	--	--	--

Ground wire	Steel 5/8"	Grade	160	D =	15.8	mm	w =	1.210	kg/m	RTS =	159.7	kN	Vibration damper :	85523

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	46.3	44.7	43.1	41.5	39.9	38.3	36.7	35.1	33.5	31.9	30.3	28.7	27.1	25.6	24.0	22.4	20.8	19.2	17.6	16.0
	H/w (m)	3902	3767	3633	3498	3363	3229	3094	2960	2825	2691	2556	2422	2287	2153	2018	1884	1749	1614	1480	1345
	Pos_1 (m)	1.15	1.10	1.10	1.05	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.65
	Pos_2 (m)	1.00	1.00	1.00	0.95	0.95	0.95	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.75	0.75	0.70	0.70	0.65	0.65	0.60
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	100	175	275	475	600	600	600	600	600	--	--	--
Terrain 2	L2 (m)	++	++	++	++	++	75	100	175	325	550	800	800	800	800	800	--	--	--	--	--
Terrain 3	L2 (m)	++	++	++	75	125	200	350	625	800	800	800	800	--	--	--	--	--	--	--	--
Terrain 4	L2 (m)	++	100	150	275	500	800	800	800	800	--	--	--	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.

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TABLE IV : APPLICATION GUIDE FOR LISTED GROUND WIRES

Ground wire	Steel 5/8"	Grade	180	D =	15.8	mm	w =	1.210	kg/m	RTS =	179.0	kN	Vibration damper :	85523

1 vibration damper / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.9	50.1	48.3	46.5	44.8	43.0	41.2	39.4	37.6	35.8	34.0	32.2	30.4	28.6	26.9	25.1	23.3	21.5	19.7	17.9
	H/w (m)	4373	4222	4072	3921	3770	3619	3468	3318	3167	3016	2865	2714	2564	2413	2262	2111	1960	1810	1659	1508
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Terrain 1	L1 (m)	++	++	++	++	++	++	++	++	++	++	++	75	125	250	300	300	300	300	--	--
Terrain 2	L1 (m)	++	++	++	++	++	++	++	++	++	75	125	250	400	400	400	400	--	--	--	--
Terrain 3	L1 (m)	++	++	++	++	++	++	++	75	125	250	475	500	500	500	--	--	--	--	--	--
Terrain 4	L1 (m)	++	++	++	++	++	75	150	300	575	575	575	575	--	--	--	--	--	--	--	--

Ground wire	Steel 5/8"	Grade	180	D =	15.8	mm	w =	1.210	kg/m	RTS =	179.0	kN	Vibration damper :	85523

2 vibration dampers / span

	%RTS	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10
	H (kN)	51.9	50.1	48.3	46.5	44.8	43.0	41.2	39.4	37.6	35.8	34.0	32.2	30.4	28.6	26.9	25.1	23.3	21.5	19.7	17.9
	H/w (m)	4373	4222	4072	3921	3770	3619	3468	3318	3167	3016	2865	2714	2564	2413	2262	2111	1960	1810	1659	1508
	Pos_1 (m)	1.20	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.00	1.00	0.95	0.95	0.90	0.90	0.85	0.85	0.80	0.75	0.75	0.70
	Pos_2 (m)	1.10	1.05	1.05	1.00	1.00	1.00	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.80	0.80	0.75	0.70	0.70	0.65	0.65
Terrain 1	L2 (m)	++	++	++	++	++	++	++	++	++	++	75	150	275	500	600	600	600	600	--	--
Terrain 2	L2 (m)	++	++	++	++	++	++	++	++	75	150	275	500	800	800	800	800	--	--	--	--
Terrain 3	L2 (m)	++	++	++	++	++	++	75	150	250	500	800	800	800	800	--	--	--	--	--	--
Terrain 4	L2 (m)	++	++	++	++	100	175	325	600	800	800	800	800	--	--	--	--	--	--	--	--

-- : No vibration damper required.
++ : Special study required.

Special study required for any span length greater than the indicated values.