



TECHNICAL MANUAL and INSTALLATION INSTRUCTIONS

# **V33070-CL2 ANTENNA**

***VTM-99-008 Rev C***

**Valcom Manufacturing Group, Inc.**

175 Southgate Drive, P.O. Box 603, Guelph, Ontario, Canada N1H6L3 Tel: 519-824-3220 Fax: 519-824-3411

Web Site: [www.valcommfg.ca](http://www.valcommfg.ca) E-mail: [sales@valcomguelph.com](mailto:sales@valcomguelph.com)

**REVISION SHEET**

<b><i>Revision</i></b>	<b><i>Description</i></b>	<b><i>Entered By</i></b>	<b><i>Date</i></b>
-	Draft Issue		04 Oct 1999
A	Amended maintenance section Added outline drawing Misc format edits Assigned number	J.Soper	19 Nov 2007
B	Added missing Figure 4.1	J.Soper	25 May2009
C	Added setscrews in Installation process and Hardware package	H.Du ong	September 17, 2012

**TABLE OF CONTENTS**

<b><u>Section</u></b>	<b><u>Page</u></b>
<b>1.0 GENERAL INFORMATION.....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 Technical Reference Data.....	1
<b>2.0 FUNCTIONAL DESCRIPTION.....</b>	<b>3</b>
2.1 General.....	3
2.2 Electrical Description.....	3
2.3 Mechanical Description.....	3
<b>3.0 MAINTENANCE.....</b>	<b>4</b>
3.1 Scheduled Maintenance . . . . .	4
3.2 Corrective Maintenance . . . . .	4
<b>4.0 INSTALLATION.....</b>	<b>4</b>
4.1 Unpacking.....	4
4.2 New Site Preparation.....	4
4.3 Assembly and Installation.....	5
4.4 Electrical Installation.....	6
<b>5.0 PARTS LIST.....</b>	<b>8</b>
5.1 General.....	8
<b>6.0 QUICK REFERENCE DATA.....</b>	<b>9</b>
6.1 General.....	9
6.2 Manufacturer's Address.....	9

**LIST OF TABLE AND FIGURE**

Figure 4.1 - Gin Pole Arrangement for V330 Series Antennas.....	7
Table 5.1 - List of Parts for the V33070-CL2 Antenna.....	8

## 1.0 GENERAL INFORMATION

### 1.1 Introduction

This manual describes the electrical and mechanical properties of the V33070-CL2 antenna. It also provides the information necessary to install, operate and maintain the antenna system.

### 1.2 Technical Reference Data

<i>Electrical Properties</i>	
<i>Frequency Range</i>	100 kHz to 30 MHz (with capacity of the antenna tuner)
<i>Resonant Frequency</i>	100 kHz to 2.0 MHz (as specified by customer)
<i>Power Rating</i>	2.0 kW below 1.5 MHz, 5 kW above 1.5 MHz
<i>Dry Withstanding Voltage</i>	30 kV
<i>Electrical Length</i>	Varies with Loading Coil Section

<b>Mechanical Properties</b>	
<b>Top Section Length</b>	17.8 feet (5.4 meter)
<b>3rd Section Length</b>	18.6 feet (5.7 meter)
<b>Loading Coil Section Length</b>	18.3 feet (5.6 meter)
<b>Bottom Section Length</b>	17.4 feet (5.3 meter)
<b>Typical Assembly Length (including Valcosphere)</b>	74.8 feet (22.8 meter)
<b>Weight</b>	Approximately 360 lbs (158 kg)
<b>Material</b>	Copper wire and strips embedded in the fiberglass and thermo-setting epoxy resin composite
<b>Finish</b>	Epoxy polyamide paint
<b>Mounting Position</b>	Vertical
<b>Base Diameter</b>	17.5 inches (44.45 cm)
<b>Mounting Hole Diameter</b>	0.718 inches (1.82 cm)
<b>Mounting Holes Dimensions</b>	12 places equal spaced on a 14.625 inch (37.15 cm) diameter bolt circle
<b>Storage Temperature</b>	-95°C to +70°C (-140°F to +158°F)
<b>Operating Temperature</b>	-50°C to +65°C (-76°F to +140°F)
<b>Wind Loading Test</b>	Up to 150 mph (240 km/hr) relative
<b>Abrasion Resistance</b>	Very Good
<b>Water absorption</b>	After 24 hours immersed: 0.2% After 48 hours immersed: 0.6% After 168 hours immersed: 2.0%
<b>Optional Accessories</b>	VTGS-20 Steel Tower/ or VHT-17 Steel Base Plate VGP-17 Gin Pole VGS-36100 Ground Screen
<b>Optional Matching Unit</b>	VMT-7117

## 2.0 FUNCTIONAL DESCRIPTION

### 2.1 General

The V33070-CL2 is intended to be used as part of an overall communication system which consists of a transmitter (or receiver or transceiver), an antenna coupler and the antenna. It is used around the world in many applications with requirements in the 100 kHz to 1700 kHz bands for marine and aeronautical radio beacon and broadcast communication systems.

### 2.2 Electrical Description

The Valcom, Model V33070-CL2 is a field proven, coil loaded, 74-foot antenna. The second section is inductively loaded to a resonant frequency slightly higher than the operating frequency specified by the customer.

### 2.3 Mechanical Description

**Top and Third Sections.** These are hollow tapered cylinders made of circumferentially and longitudinally wound fibreglass filaments using a thermosetting epoxy resin matrix. Embedded in the composite are multiple beryllium copper strips laid in a single-turn spiral and secured at the top end to a hemispherical corona ball and at the bottom to a threaded female ferrule into which the next section is secured. The surface is smoothed, primed and painted with a polyamide epoxy surface coating.

**Coil Loaded Section (Second Section)** The coil loaded section is constructed in the same manner as the top and third sections. The coil is wound using enamel copper wire and is also embedded in the fiberglass. The ends of the coil are braised to the respective ferrules.

**Bottom Section.** The construction and finish are the same as for the other sections except that the diameter expands out to meet the mounting base. The ferrule is threaded to fit into the bottom of the Coil Loaded section. Multiple parallel conductors are connected to the ferrule at the top and to a conducting ring near the bottom. The feed terminal extends from the bottom ring to the surface of the antenna approximately 18.0 inches from the bottom of the base flange. The base can withstand a flash over voltage of 30 kV.

**NOTE:** The sections of the antenna cannot be interchanged with other antennas due to the unique locations of the locking screw holes.

### 3.0 MAINTENANCE

#### 3.1 *Scheduled Maintenance*

The antenna is virtually maintenance free. The external finish is an epoxy polyamide two part compound paint. The minimum finish life before showing signs of deterioration should be at least six years under normal climate condition.

When used in salt-water environments, it is recommended to wash the antenna base with fresh water to remove any build-up of dried salt residue. This should be performed on a monthly basis or after prolonged exposure to sea-spray.

Use a small wire brush to clear any debris from the drain groove found in the bottom of the antenna base.

#### 3.2 *Corrective Maintenance*

Generally, no corrective maintenance is possible or required. If one section is severely damaged, it must be replaced by a new section. Workshops having experience in handling epoxy fibreglass composite structures may attempt the repair of minor surface damage if practicable.

#### **NOTE**

DO NOT USE LEAD BASE PAINT TO TOUCH-UP OR REPAINT THE ANTENNA. USE ONLY EPOXY BASE PAINT.

## 4.0 INSTALLATION

### 4.1 *Unpacking*

Open the shipping crates and remove the antenna sections. Remove all packing material including the male ferrule protectors on the antenna sections. The V33070-CL2 antenna as shipped consists of the items listed in Table 5.1. Check that all of the items are present and in good condition.

### 4.2 *New Site Preparation*

- (1) Check to see that the underside of the steel base plate at the site is free of cables and other obstructions.
- (2) Excavation and pouring of concrete pad to new site (see IAW Foundation Details for VHB-17 Hinge Plate/ VTGS-20 Steel Tower).
- (3) Installation Ground Screen to Valcom's Specification IAW VGS-36100 Ground Screen.

### 4.3 *Assembly and Installation Antenna on the site*

The following steps should be followed to assemble the V33070-CL2 antenna (see Figure 4.1).

- (1) Remove retainer pin on the hinge plate (or steel tower) and open top plate to 90 degrees mount the bottom plate of the hinge plate on the anchor bolts. Secure with hardware (flat washer, lockwasher, and nut) on each bolt.
- (2) Obtain six saw horses or other supports that will hold the complete antenna horizontally at a convenient working height and place them in the assembly area. The assembly area must be a cleared working space approximately 90 feet long and 20 feet wide.
- (3) Support the base section (item 1, Table 5.1) on two of the saw horses and tie it in place.
- (4) Align mounting holes in the plate with holes of the antenna flange, secure base section to the plate with hardware, fed through from underside.

- (5) Tie a rope (3/4" diameter polypropylene) to one eye of the gin pole, tie another rope as the same type to one eye of the gin pole. Slide gin pole into the pipe attachment and secure.
- (6) Support the second section (item 2, Table 5.1) on the other two saw horses so that the two sections lie in the same straight line.
- (7) Make sure the threads of the male ferrule on the base section are clear of foreign material and free of burrs.
- (8) Assemble the second antenna section onto the base section and tighten to align the arrows at the joint using the strap wrench supplied (item 7, Table 5.1). Install the setscrews and seal with the sealant provided.
- (9) Assemble the third section (item 3 , Table 5.1) to the second section by repeating steps 6 to 8.
- (10) Assemble the fourth section to the third section by repeating steps 6 to 8.
- (11) After all sections are assembled, assemble the Valcosphere to the top of the fourth section. Secure with setscrews and sealant.
- (12) The antenna now is ready to raise to its final position.
- (13) Tie one rope (from gin pole eye) to the position on antenna specified on Figure 4.1. A timber hitch knot is recommended to prevent slipping.
- (14) Erect antenna by applying a gradual and constant pull on the rope referred to as the "Pulling Force" (a winch or vehicle is recommended).
- (15) Once the antenna is in the vertical position, insert retainer pin back into hinge plate, secure with tension pin. Use bolts (supplied) to secure upper and lower plates of the hinge plate together.
- (16) Electrical connections can now be made.

#### 4.4 *Electrical Installation*

Very carefully secure the lead from the transmitter or transceiver to the antenna by means of the acorn screw and lock-washer provided (items 5 and 6, Table 5.1).



5.0 PARTS LIST

5.1 General

A list of parts shipped with the V33070-CL2 antenna appears in Table 5.1.

Table 5.1 - List of Parts for the V33070-CL2 Antenna

Item No.	Part Number	Description	Qty	Notes
1		Base Section (V33070-CL2)	1	
2		Section 2 Section 3 Section 4	1	
3		Valcosphere Top Hat Whips	1	
4		(optional) Strap Wrench Silicone	1	
5	VD-77-00132-1	Sealant Hardware Package	1	
6		(Washer, Lock-Spring, Helical, 3/8 inch nominal, Phosphor Bronze, Lock Setscrews)	1 set	
7	No. 5		1 ea	
8			1	
9			1 set	

**6.0 QUICK REFERENCE DATA**

**6.1 GENERAL**

Quick reference engineering data for use during planning and installation activities for the V33070-CL antenna is presented on the following pages.

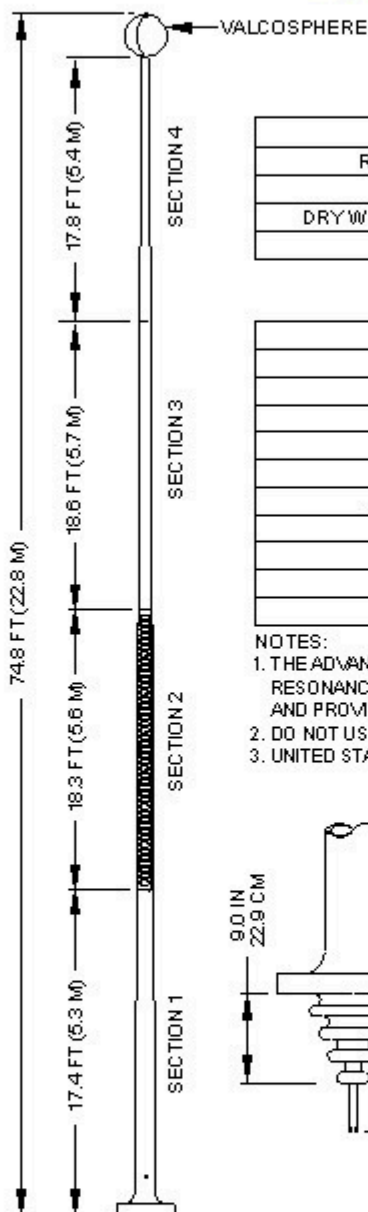
\* Quick Reference Data - V33070-CL Antenna

**6.2 MANUFACTURER'S ADDRESS**

<b><i>Postal address:</i></b>
Valcom Manufacturing Group, Inc. P.O. Box 603 Guelph, Ontario Canada N1H 6L3

<b><i>Shipping address:</i></b>
Valcom Manufacturing Group, Inc. 175 Southgate Drive Guelph, Ontario Canada N1G 3M5

## QUICK REFERENCE DATA V33070-CL2 SERIES



V33070-CL2	V33070-FT-CL2
------------	---------------

### ELECTRICAL CHARACTERISTICS

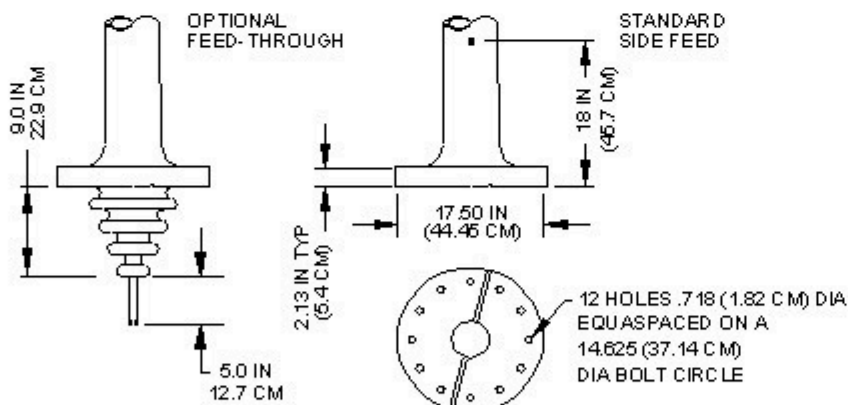
FREQUENCY RANGE	100 KHz to 30 MHz WITH TUNER
RESONANT FREQUENCY	100 KHz TO 2 MHz-SPECIFIED BY CUSTOMER
POWER RATING	2 KW BELOW 1.5 MHz, 5 KW ABOVE 1.5 MHz
DRY WITHSTANDING VOLTAGE	30 KV
ELECTRICAL LENGTH	VARIES WITH LOADING SECTION

### MECHANICAL CHARACTERISTICS

MECHANICAL LENGTH	74.8 FT (22.8 M)	76.0 FT (23.2 M)
BASE INSULATOR	EPOXY/FIBREGLASS	
TOP TERMINATION	VALCOSPHERE	
JOINTS	BRONZE FERRULE C/W LOCKING PIN	
ICE LOADING TEST	TO 150 MPH (240 Km/Hr)	
WIND LOADING TEST	.75 INCH (1.87 CM) AT 100 MPH (160 Km/Hr)	
ABRASION RESISTANCE	GOOD	
CENTRE OF GRAVITY	25 FT (7.6 M)	24 FT (7.3 M)
TEMPERATURE	-60°F TO 150°F (-50°C TO 65°C)	
FINISH	EPOXY POLYAMIDE PAINT	
WEIGHT	350 LBS (158 KG)	360 LBS (162 KG)

**NOTES:**

1. THE ADVANTAGE OF THE CENTRE LOADING COIL IN SECTION TWO IS TO PROVIDE REDUCED RESONANCE OVER A STRAIGHT VERTICAL WHIP, THEREFORE REDUCING BASE FEED VOLTAGE AND PROVIDING A GREATER POWER HANDLING CAPABILITY.
2. DO NOT USE LEAD BASE PAINT TO TOUCH-UP OR REPAINT ANTENNA.
3. UNITED STATES PATENT NUMBERS 3,725,944 AND 4,500,888 APPLY.



P.O. BOX 603 GUELPH, ONTARIO, CANADA, N1H 6L3  
 TEL 519-824-3220 FAX 519-824-3411  
 INTERNET: [www.valcom-guelph.com](http://www.valcom-guelph.com) EMAIL: [enquiries@valcom-guelph.com](mailto:enquiries@valcom-guelph.com)