

HARDIN COUNTY ZONING
Application for Special Permit

Fee: \$75.00

Application is hereby made by:	<u>Josh Odom -- Wind Development Manager (Agent)</u>
	<u>ECRNA; 353 N Clark St, 30th Fl; Chicago, IL 60654</u>
Describe operation or installation	<u>Install temporary 60-meter tall meteorological tower.</u>
On the following described parcel:	<u>The South Half of the North Half of the Southeast Quarter, Section 18, Township 87N, Range 22W. PIN: 872218400002.</u>

Lot or tract area	<u>39.21 Acres</u>	Average width of lot	_____								
Height of structure	<u>197</u>	feet; number of stories	<u>N/A</u>								
Dimensions from right-of-way or lot lines:											
Front	<u>E: 2,300+</u>	feet;	Rear	<u>W: 220+</u>	feet;	Side	<u>N: 220+</u>	feet;	Side	<u>S: 400+</u>	feet

The undersigned applicant certifies under oath and under the penalties of perjury that the foregoing information is true and correct.

William Hinderaker and Jan Hinderaker
Owner

Josh Odom
Agent

Print Form

<i>Office Use Only</i>	
Permit is granted to proceed in accordance with information shown on this application and receipt of \$ _____ fee is acknowledged.	
Date approved:	_____
_____ Hardin County Zoning Administrator	

Show a sketch of tract or lot on Form No. 2, with dimensions, proposed buildings, yards, etc.
All fees are non-refundable.

March 25, 2019

Mrs. Jessica Sheridan
Zoning Administrator
1215 Edgington Ave, Suite 5
Eldora, IA 50627

Re: Letter of Authorization

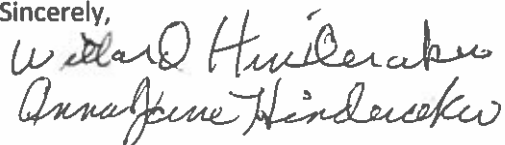
Property Address:	~24001-24999 Co Rd S21 (approximately 1665' N of 250 th St)
Legal Description:	S/2 N/2 SE/4 of 18-87N-22W
Assessor Parcel Numbers:	872218400002

Dear Mrs. Sheridan,

I, Willard and Anna Hinderaker, are the owners of the above described real property.

I authorize Josh Odom of E.ON Climate & Renewables North America, LLC to act as an agent on our behalf for the purpose of filing a Special Permit Application to erect a temporary meteorological tower on said property, subject to the approval of your office.

Sincerely,



Willard & Anna Hinderaker
606 Isabella
Radcliffe, IA 50230



Proposed Met Tower Location

Hardin County, Iowa



- Proposed Met Tower Location
- Parcel Boundary
- Section Line
- Township/Range Boundary
- Road Classification
- County Road/Highway
- Local Road

Parcel Legal Description:
S½ N1/4 SE¼ 18-47N-22W

Date: March 12, 2019
Map prepared by:
E.ON Energy Research Center, LLC
1800 North American Blvd.
Darien, North American 1883



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Notice Criteria Tool

[Notice Criteria Tool - Desk Reference Guide V_2018.2.0](#)

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference [CFR Title 14 Part 77.9](#).

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the [FAA Co-location Policy](#)
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

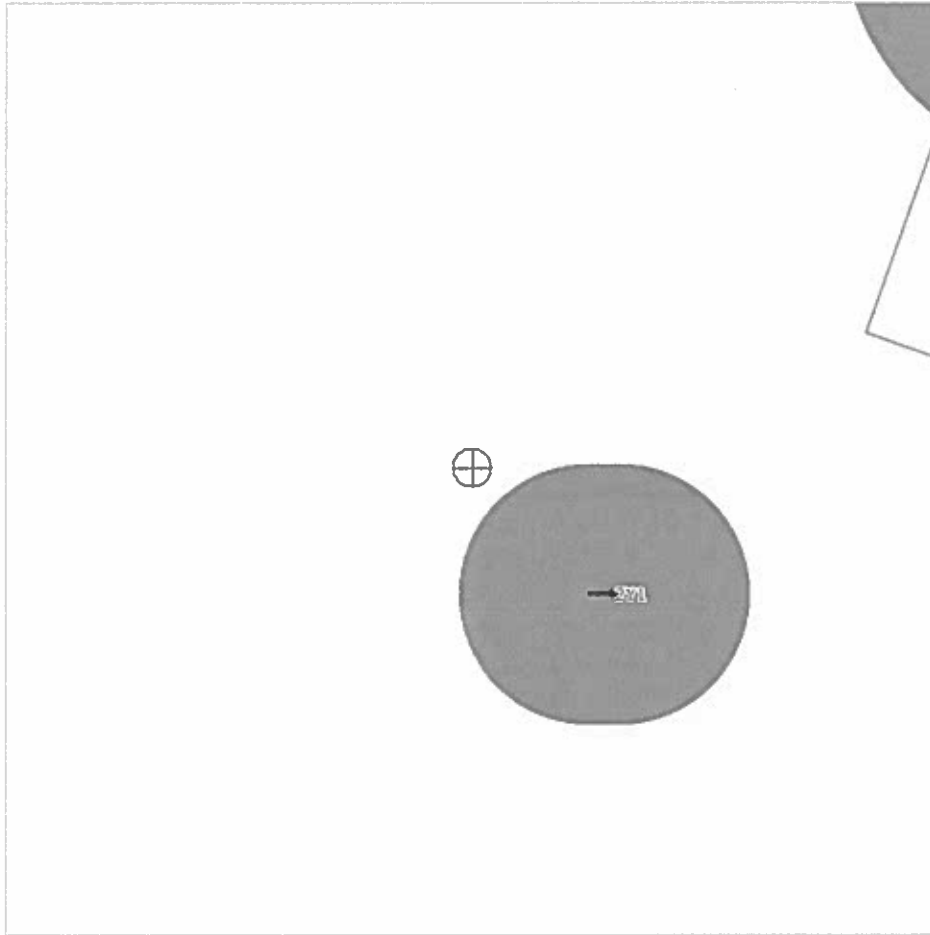
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the [Air Traffic Areas of Responsibility map](#) for Off Airport construction, or contact the [FAA Airports Region / District Office](#) for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	<input type="text" value="42"/> Deg <input type="text" value="20"/> M <input type="text" value="39.31"/> S <input type="button" value="N"/> <input type="button" value="v"/>
Longitude:	<input type="text" value="93"/> Deg <input type="text" value="27"/> M <input type="text" value="11.42"/> S <input type="button" value="W"/> <input type="button" value="v"/>
Horizontal Datum:	<input type="button" value="NAD83"/> <input type="button" value="v"/>
Site Elevation (SE):	<input type="text" value="1191"/> (nearest foot)
Structure Height :	<input type="text" value="197"/> (nearest foot)
Traverseway:	<input type="button" value="No Traverseway"/> <input type="button" value="v"/> (Additional height is added to certain structures under 77.9(c)) User can increase the default height adjustment for Traverseway, Private Roadway and Waterway
Is structure on airport:	<input checked="" type="radio"/> No <input type="radio"/> Yes

Results

You do not exceed Notice Criteria.

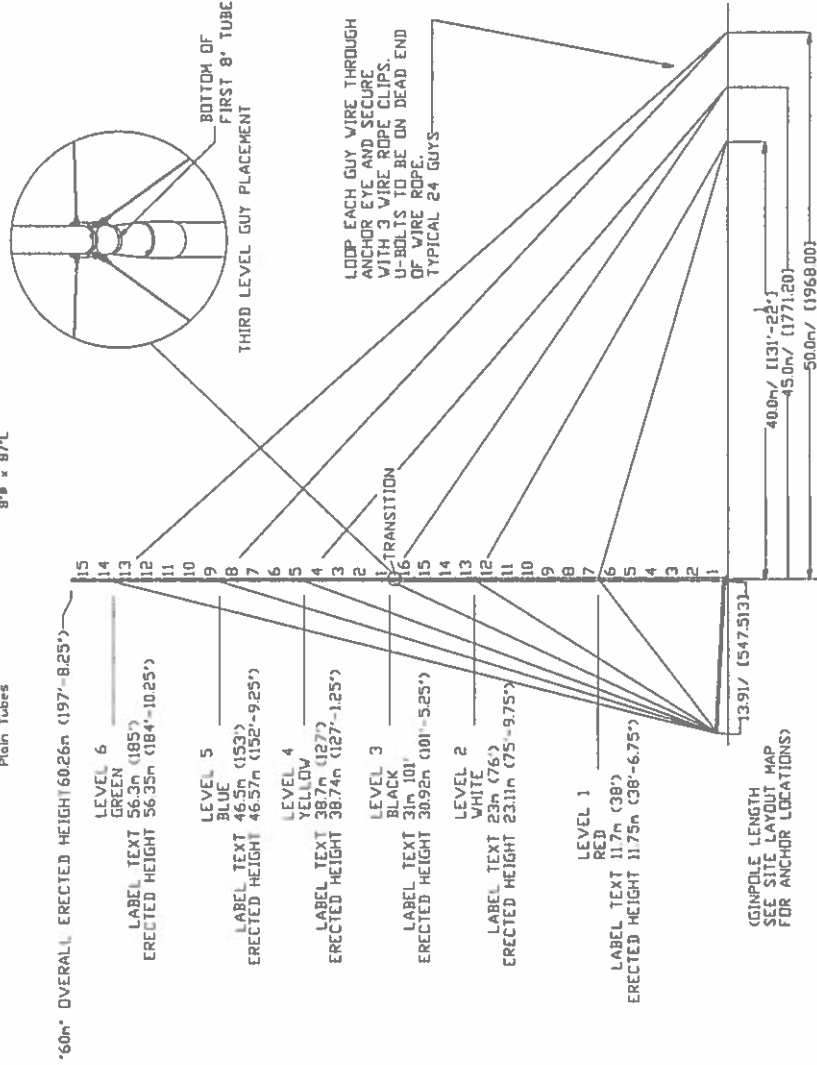


60m XHD with
Standard Footprint

Tower Layout

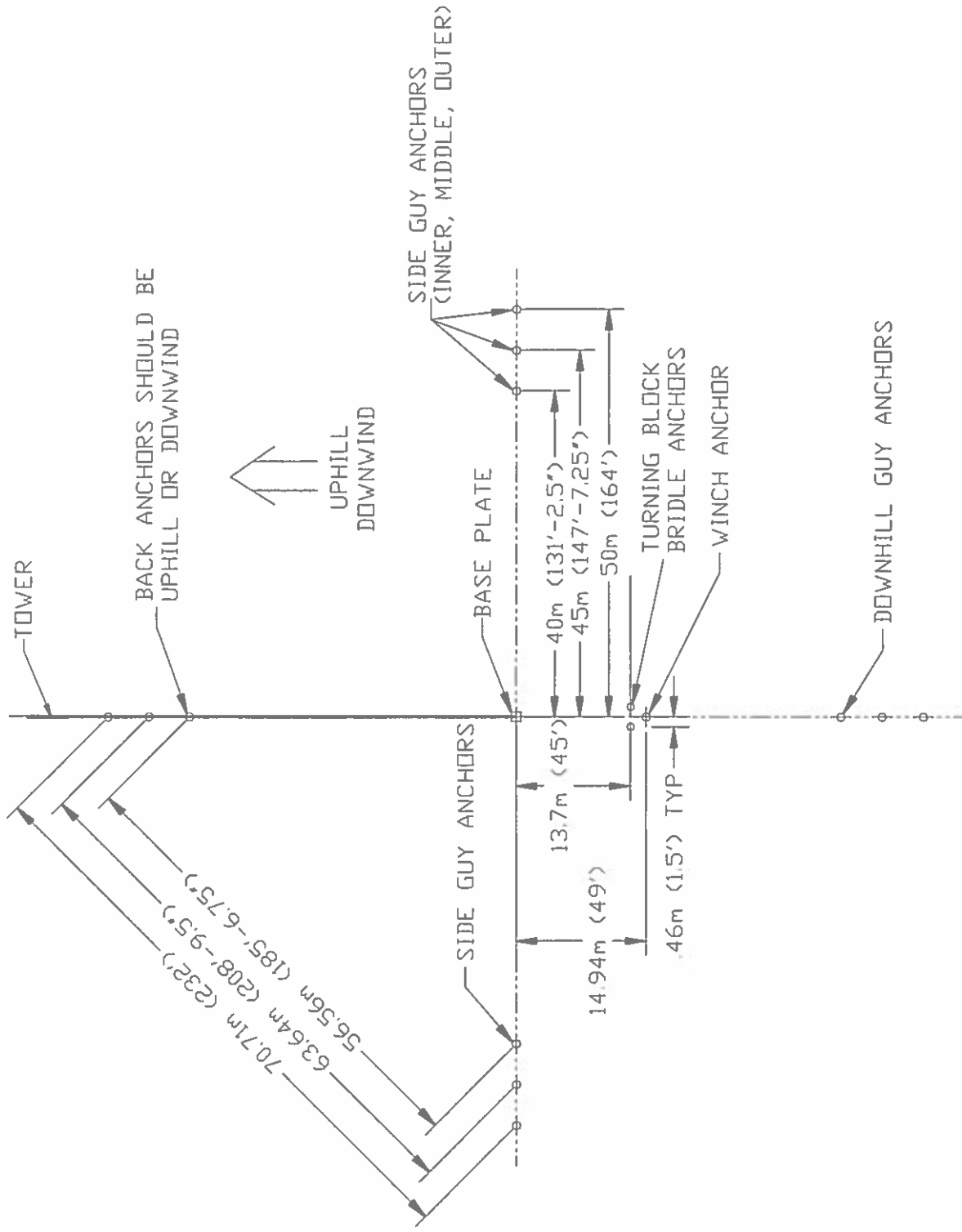
TUBE SPECS (in order of assembly)

Tower:
 Base Tube (with pivot pin hole) 10' 9" x 87'L (1 tube)
 Plain Tubes (short) 10' 9" x 87'L (4 tubes)
 Plain Tubes (short) 10' 9" x 73'L (1 tube)
 Plain Tubes 8'9" x 87'L (15 tubes)
 Gin Pole:
 Base Tube (with pivot pin hole) 8'9" x 87'L
 Plain Tubes 8'9" x 87'L



60m XHD with
Standard Footprint

Site Layout



60m XHD with
Standard Footprint

Stamped Drawing

Materials						
	Outer Diameter	Wall Thickness	Description	Yield Strength	Breaking Strength	Corrosion Protection
1	10 inch 254 mm	0.099 inch 2.51 mm	MT 1020	45.0 ksi 310 MPa	N/A	Hot Dipped Galvanized
2	8 inch 203 mm	0.086 inch 2.17 mm	MT 1020	45.0 ksi 310 MPa	N/A	ASTM 653
3	10-8 inch laser 254-203 mm	0.102 inch 2.6 mm	MT 1016	45.0 ksi 310 MPa	N/A	
4	0.25 inch 6.35 mm	N/A	7x19 Galv. Almond	N/A	7000 lb 31.1 kN	Galvanized

Reactions and member forces										
	No ice		6.4mm (1/4") ice		12.7mm (1/2") ice		19 mm (3/4") ice		25 mm (1") ice	
	Imperial	SI	Imperial	SI	Imperial	SI	Imperial	SI	Imperial	SI
10 m (33 feet) wind velocity (Fastest mile)	111 mph	48.6 m/s	83 mph	37.1 m/s	68 mph	29.5 m/s	51 mph	22.8 m/s	33 mph	14.8 m/s
Top of tower wind velocity (Fastest mile)	143 mph	64.1 m/s	107 mph	47.8 m/s	85 mph	38.1 m/s	66 mph	29.4 m/s	43 mph	19.1 m/s
Radiat ice thickness	0 in	0 mm	0.25 in	6.35 mm	0.50 in	12.7 mm	0.75 in	19.1 mm	1.00 in	25.4 mm
Inner guy anchor force (angle from horizontal)	4.2 kLb 18.7 kN	2.4 kLb 10.7 kN	2.4 kLb 10.7 kN	2.2 kLb 9.7 kN	2.2 kLb 9.7 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN
Middle guy anchor force (angle from horizontal)	3.5 kLb 15.7 kN	2.4 kLb 10.7 kN	2.4 kLb 10.7 kN	2.2 kLb 9.7 kN	2.2 kLb 9.7 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.2 kLb 9.8 kN	2.2 kLb 9.8 kN
Outer guy anchor force (angle from horizontal)	8.1 kLb 36.1 kN	22.7 kN 101 kN	4.2 kLb 18.7 kN	3.8 kLb 16.7 kN	3.8 kLb 16.7 kN	3.0 kLb 13.4 kN	3.0 kLb 13.4 kN	2.8 kLb 11.8 kN	2.8 kLb 11.8 kN	2.8 kLb 11.8 kN
Tower base force (Note K) (horizontal - during erection)	8.2 kLb 36.5 kN	23.1 kN 103 kN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tower base force (vertical)	12.2 kLb 54.5 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	22.1 kLb 98.2 kN	22.1 kLb 98.2 kN
Erection anchor force (Note K) (angle from horizontal)	7.2 kLb 32.0 kN	32.0 kN 142 kN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Maximum guy tension	2.8 kLb 12.5 kN	2.4 kLb 10.7 kN	2.4 kLb 10.7 kN	2.2 kLb 9.7 kN	2.2 kLb 9.7 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN	2.1 kLb 9.3 kN
Maximum tower tube stress (compression)	15.1 ksi 104 MPa	11.3 ksi 78 MPa	11.3 ksi 78 MPa	11.0 ksi 76 MPa	11.0 ksi 76 MPa	8.8 ksi 62 MPa	8.8 ksi 62 MPa	8.3 ksi 59 MPa	8.3 ksi 59 MPa	8.3 ksi 59 MPa
Maximum tower tube stress (tension)	13.9 ksi 96.8 MPa	8.2 ksi 57.6 MPa	8.2 ksi 57.6 MPa	4.1 ksi 29 MPa	4.1 ksi 29 MPa	2.6 ksi 18 MPa	2.6 ksi 18 MPa	1.1 ksi 7.7 MPa	1.1 ksi 7.7 MPa	1.1 ksi 7.7 MPa
Maximum tower tube moment	75 in-kLb 8.4 kN-m	37 in-kLb 4.2 kN-m	37 in-kLb 4.2 kN-m	28 in-kLb 3.2 kN-m	28 in-kLb 3.2 kN-m	19 in-kLb 2.2 kN-m	19 in-kLb 2.2 kN-m	9.9 in-kLb 1.1 kN-m	9.9 in-kLb 1.1 kN-m	9.9 in-kLb 1.1 kN-m
Maximum tower tube axial load	12.2 kLb 54.4 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	16.8 kLb 73.9 kN	22.1 kLb 98.1 kN	22.1 kLb 98.1 kN	22.1 kLb 98.1 kN
Maximum top deflection	32 inches 812 mm	28 inches 687 mm	28 inches 687 mm	23 inches 582 mm	23 inches 582 mm	12 inches 312 mm	12 inches 312 mm	6 inches 153 mm	6 inches 153 mm	6 inches 153 mm
Initial guy tension	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN	0.18 kLb 0.8 kN

Notes

A) Wind forces and allowable member loads are calculated using ANSI/TIA/EIA-222-F, (1996), "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures".

B) Wind speeds are fastest mile wind velocity per EIA-222-F. EIA-222-F wind loading coefficients: $C_e=1.09$, $C_d=1.0$, $\alpha=2/7$.

C) Fastest mile (fm) wind speed can be converted to an approximate three second (3sec) wind speed using the equation:
 $V(3sec) = 1.22 V(fm)$ for $V(fm) \leq 100$ mph

D) Guy joint efficiency = 0.9 and the guy safety factor is greater than or equal to 2.0.

E) An ANSYS large deflection FEA model using beam (Pipe18) and truss (Link10) elements with distributed wind load was used to calculate member forces and reactions.

F) Tower allowable stress design per American Institute of Steel Construction (AISC), "Allowable Stress Design", 9th Ed. 1989, Chapter I, equations H1-1, H1-2

G) This tower design meets the structural requirements of EIA-222-F, sections 1.2, 3.6.8 for the given loading condition. This analysis does not apply to EIA-222-F sections 7.11, 12.13.

H) Foundation design must be considered separately and is not a part of this analysis. Foundation details must be approved for the specific application and site by a qualified professional.

I) A locally qualified professional must determine the applicability of this analysis for the expected site conditions. Due to the lack of involvement in the siting or construction phase of this product at a specific location, liability is strictly limited to issues arising from negligence or willful misconduct by NRG or the professional engineer completing this analysis. No warranty, expressed or implied, is made concerning the suitability of this product for a given application or location.

J) Given dimensions are nominal. Actual dimensions may vary.

K) Erection forces are at zero wind speed and do not include any lower attachments.

Units notation

mm - Millimeters
m - Meters
m/s - Meters per second
kN - 1,000 Newtons
MPa - 1,000,000 Pascals
kLb - 1,000 US pounds
ksi - 1,000 US pounds per inch²
mph - Miles per hour
Ø - Diameter

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:

FRACTIONS DECIMALS MILLIS
 $\pm 1/16$ ± 0.030
 $\pm 1/32$ ± 0.015
 $\pm 1/64$ ± 0.008

DO NOT SCALE DRAWING

APPROVALS DATE
Checked: DJR 06/27/07
Approved: APB 07/04/07

DATE: 06/27/07

REV: B

DESCRIPTION: N4344

SCALE: NTS

PAGE: 1 of 1

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18 April 2011