Primary Design Components:

Competing Systems:

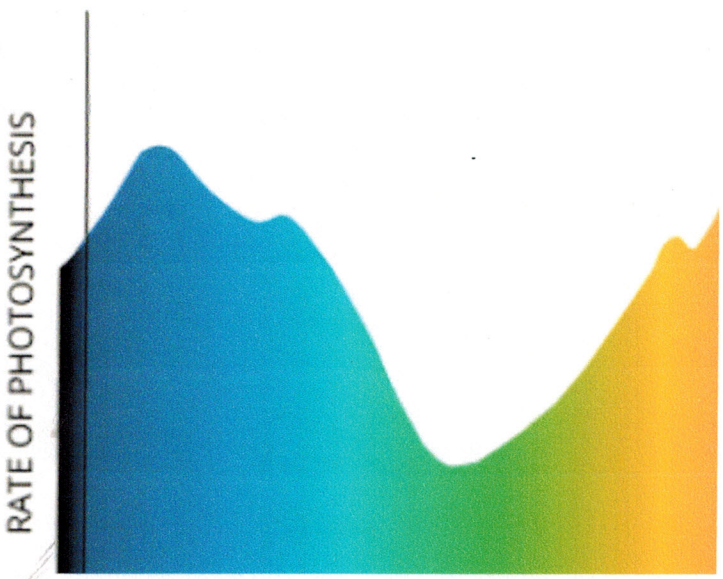
http://cropbox.co/index.php/cropbox/greens-herbs

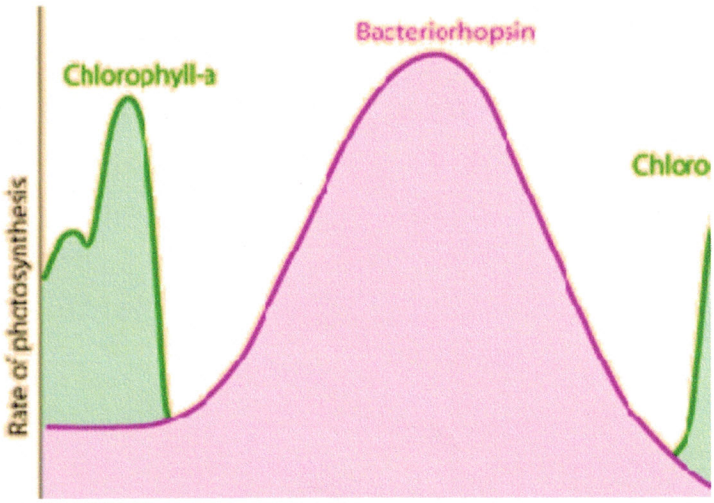
http://www.growtainers.com/

Lighting Comparisons:

http://www.compareledgrowlights.com/conclusion/

1. Alternate Lighting (separate frequencies as opposed to combined)





Do different light spectrums do different work in plants?

Not only do plants focus on specific light spectrums for photosynthesis but different light spectrums are used for different types of growth in plants. There are millions of photosynthetic receptors in a leaf of a green plant. Each receptor includes specialized pigments that absorb specific frequencies during photosynthesis. **By measuring the amount of oxygen produced under <u>various light spectrums</u> we can measure the amount of photosynthetic activity under each light spectrum. This has produced a very detailed map of which light spectrum is related to which type of plant growth.**

Based on a common set of statements from more than a dozen sources which support light frequencies best for photosynthetic activity, we recommend 450nm and 690nm, (light blue) and (orange/red)

Multiple light bars housing sufficient quantities of the specific colors necessary to thoroughly cover vegetation as it rotates is recommended.

Because different plants require and thrive at different light frequencies, it makes the most sense financially to create Specialized LED "Light Sticks" that can be interchanged and replaced based on the type of crop one will grow. Maximizing plant yield is a function of several contributing elements which include lighting type/frequency.

We propose to build and implement the same sized and output "sticks" using individual colors which will fit in the same socket/footprint. In addition, the combination of strategically placed "Light Sticks" in conjunction with parabolic reflectors can distribute the light over a number of moving plant containers with relatively equal distribution sharply recuing the total number of LED lights to accomplish the same thing while also reducing the total amount of watts per pound of crop yield.

Currently, the leaders in Cargo Container Greenhouses use stationary racking with lights at each level of racking which serves to reduce the total vertical height of growing area (defeating the purpose of 3 dimensional growing environments)

Potential cost reduction using proposed "Light Stick" approach can be as much as 50% of conventional mid range lighting.

2. Stationary racking vs. rotary/vertical carousel)

Sample racking structure

https://www.youtube.com/watch?v=ffm8bCFY_8w

http://www.zenhydro.com/hydro-flow-commercial-grade-chrome-storage-rack-6-shelves-w-backstop-casters.html?utm_source=google_shopping&gclid=CJDL1tf1rtICFVgvgQoddJUBng

https://www.nwgsupply.com/products/hydro-flow-commercial-grade-chrome-storage-rack-6-shelves-w-backstop-casters?gdffi=87c68efd9c9b487981a9b67a4daa2ec6&gdfms=C185C5CD0C0B4599ACE330F58B938F1A&gclid=CJKO7qD8rtICFU8jgQodGg0LfQ

Standard SS racking has significant limitations as it is used in conjunction with standardized Grow Light fixtures suspended overhead of Grow Pans/Containers. With the combined elements of temperature control, minimum spacing for healthy crop production and cultivation, standard racking is both expensive and lacks the kind of versatility that needs to be present in this particular setting where high school students and elderly can work with the materials without a great deal of effort or risk.

Additionally, the standard steel racking is expensive and cumbersome. Most models have limited adjustment options relative to spacing. Lighting and water provision related to fixed racking becomes expensive and complicated creating repair and maintenance issues as the system is used year over year.

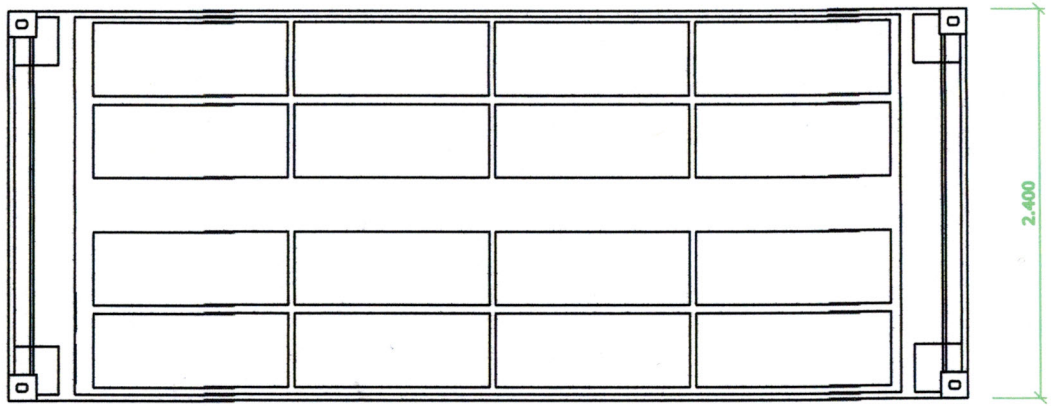
A vertical carousel such as the accompanying diagram shows can have the ability to quickly and easily add or subtract grow pans and change spacing based on mature plant height requirements unhindered by any overhead lighting or water provisioning components.

The single most expensive electro-mechanical component will be the 12VDC Leeson Gear Motor averaging less than $200 per unit for 8 units per 20' container which will drive the continuous rotation passing the individual grow pans passed the individual "Light Sticks" as well as the fill ports of the water provisioning system (activated by floats and analog sensors

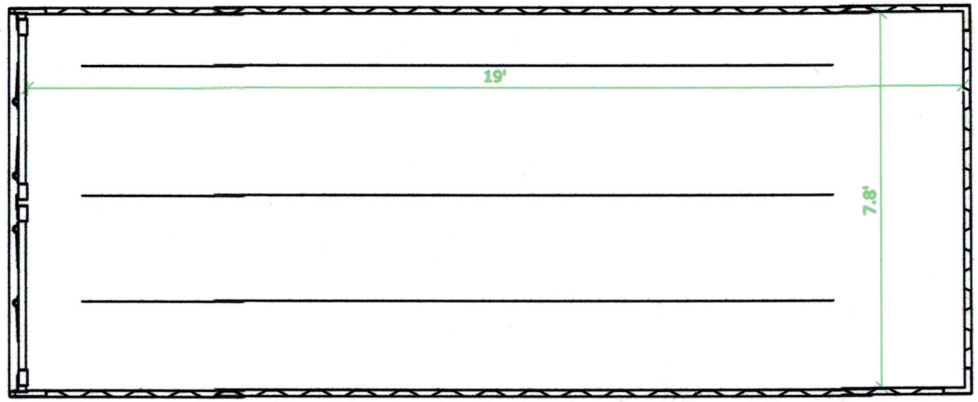
3. Water/nutrient structure

12″ plant height / 6″ Pan height / 3″ LED fixture height/ clearance between LED fixture and plant at maturity =3″

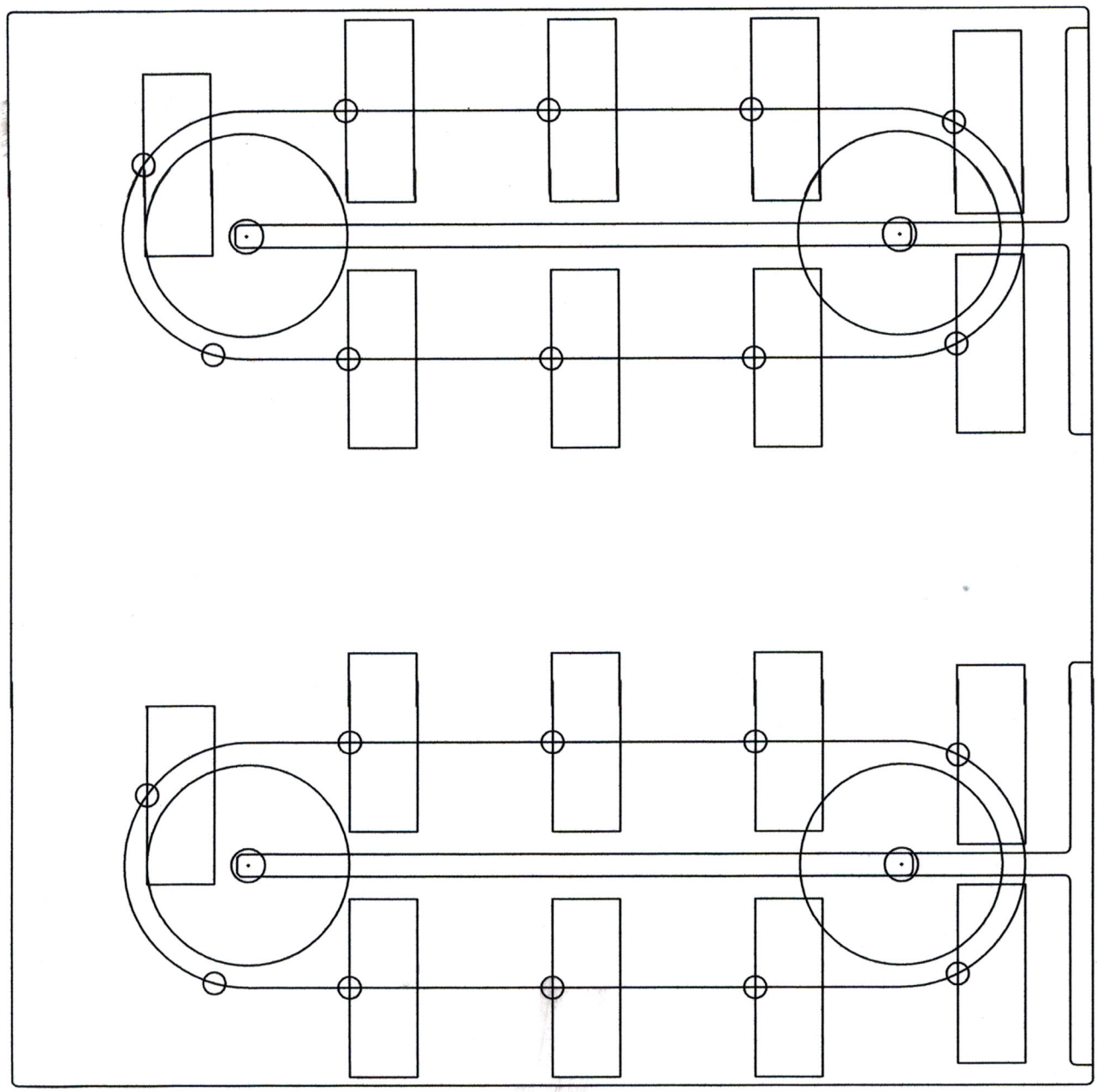
Standard ISO 20'

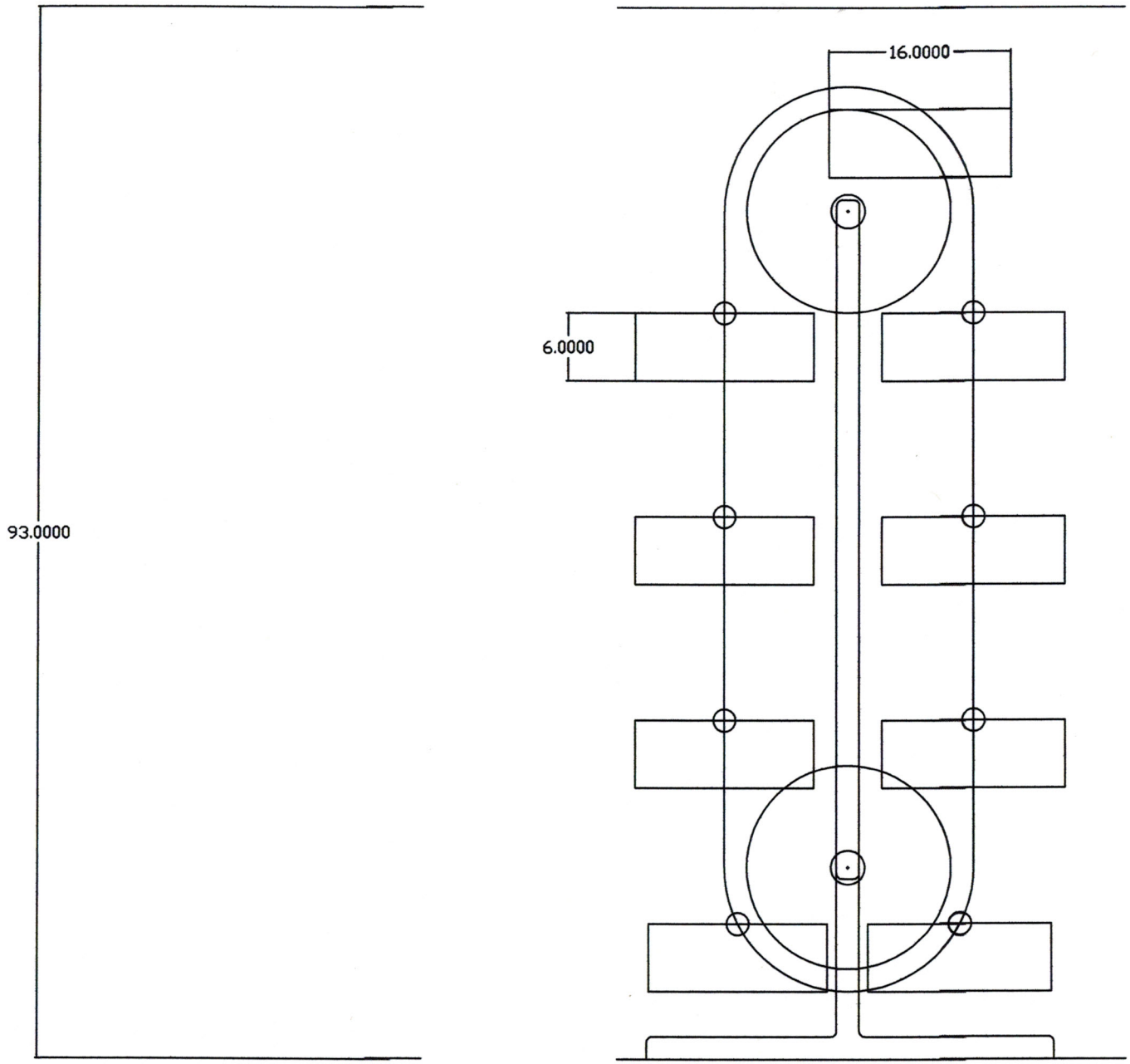


Plan

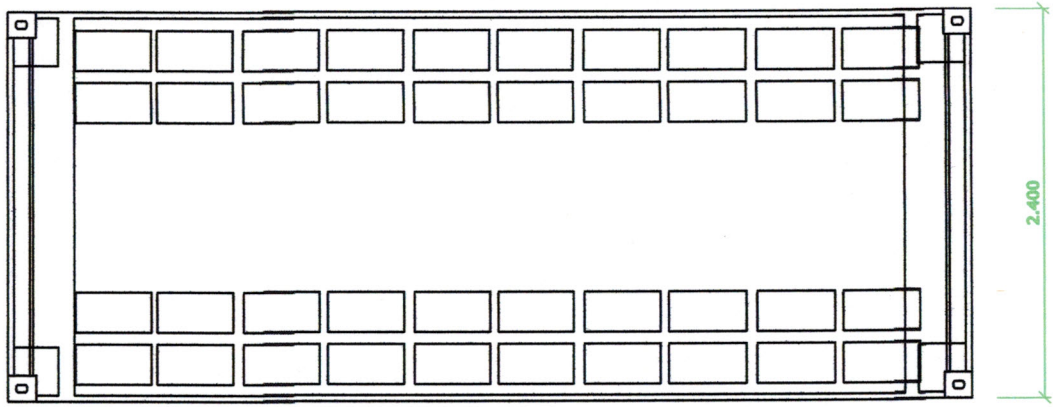


Long Section



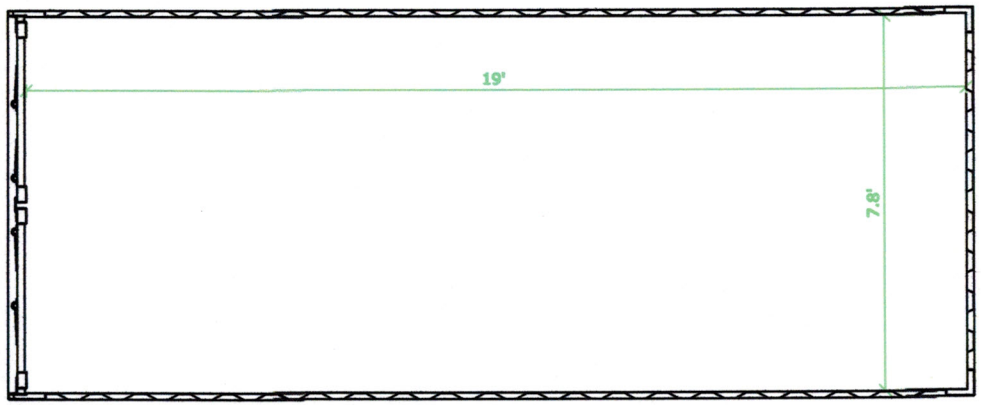

16.0000
6.0000
93.0000

Standard ISO 20'



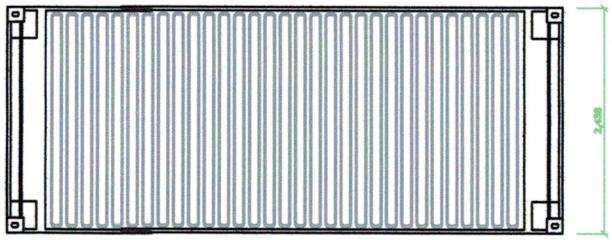
Plan

12″ plant height / 6″ Pan height / 3″ LED fixture height/ clearance between LED fixture and plant at maturity =3″

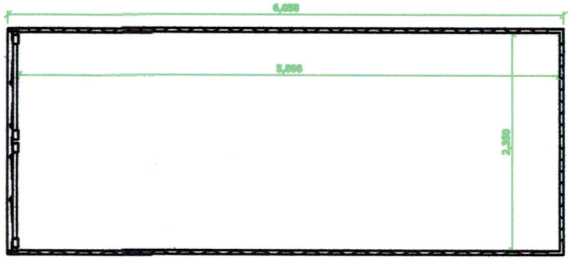


Long Section

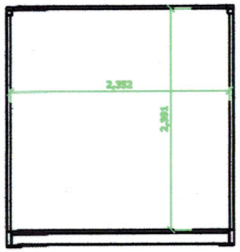
Standard ISO 20'



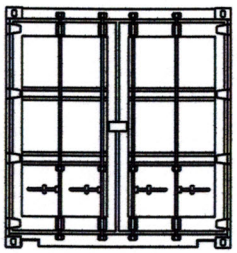
Plan



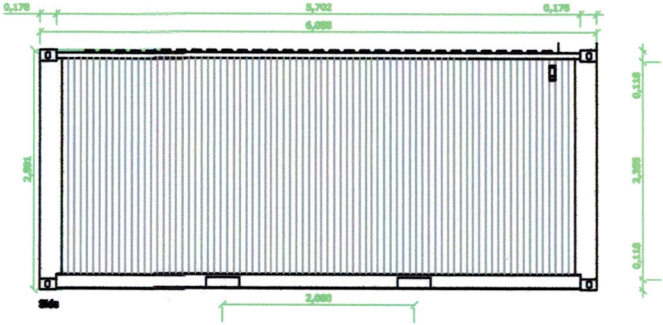
Long Section



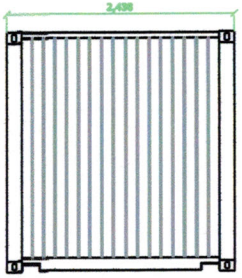
Cross Section



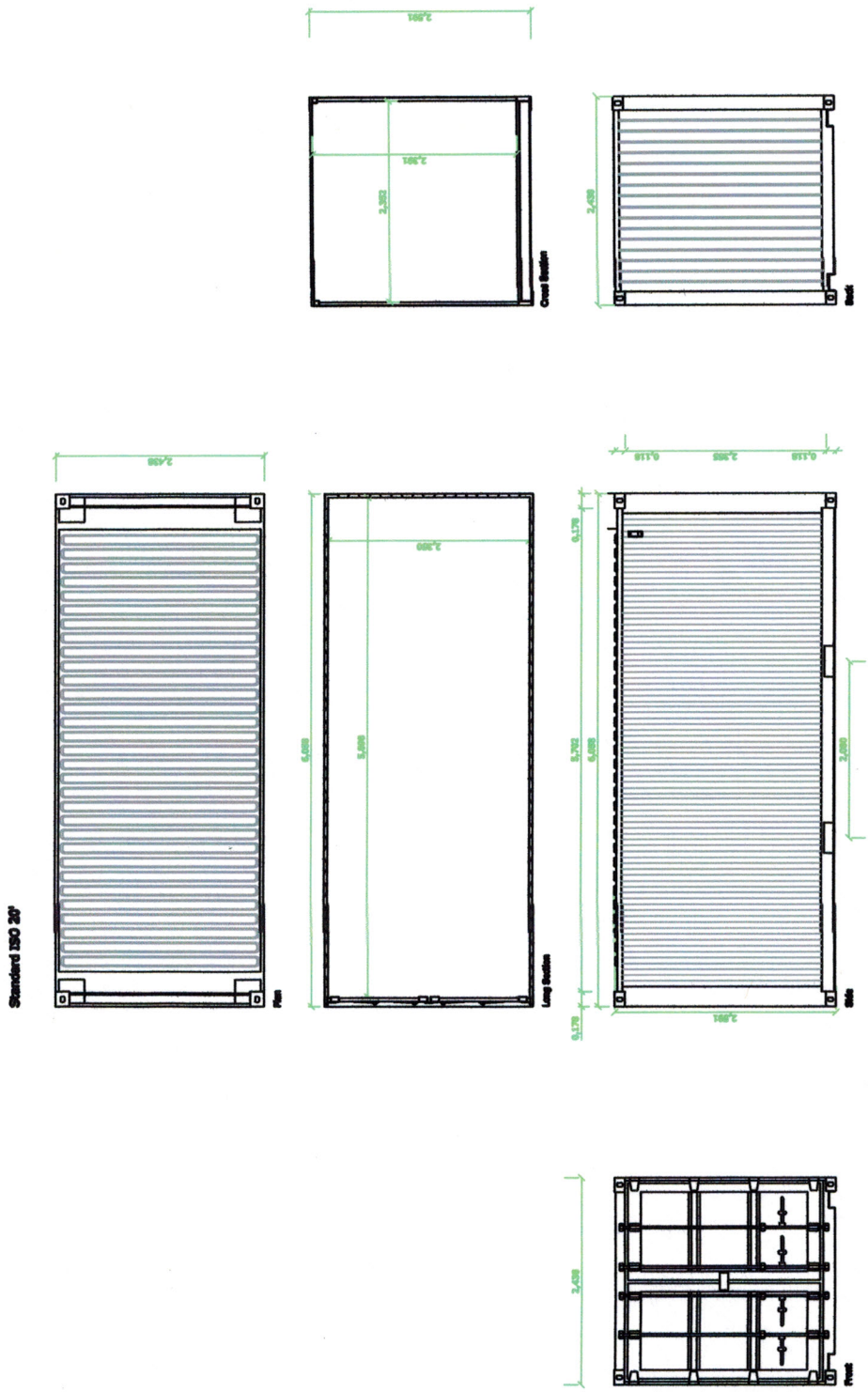
Front



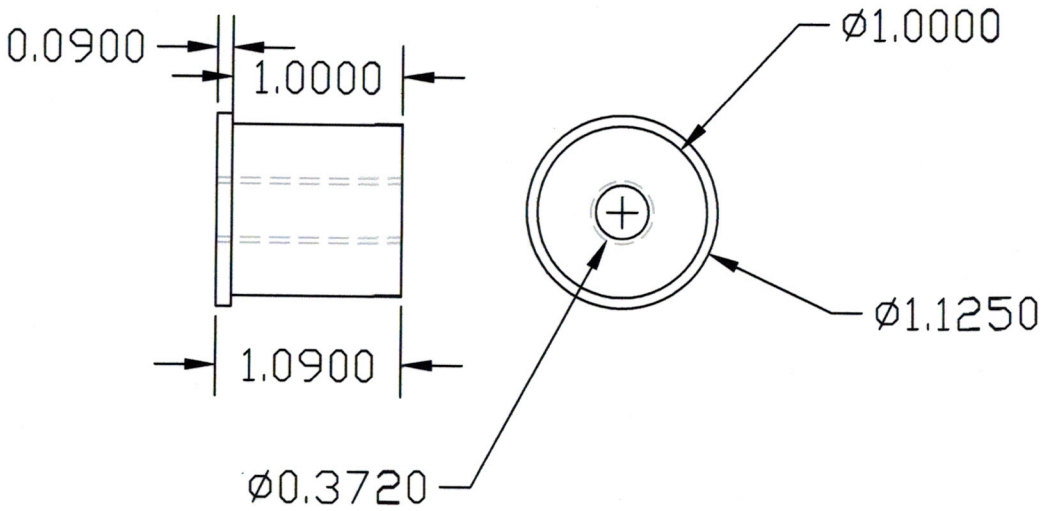
Side



Back


Standard ISO 20'
Plan
Long Section
Side
Cross Section
End
Floor

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



Bearing Designation: MSC – 01377662
2 per assy

PRIMARY: millimeter
UNLESS OTHERWISE SPECIFIED
REMOVE ALL BURRS & BREAK
ALL EDGES .25.
TOLERANCES PER:
X ± 2.5
.X ± .25
.XX ± .13
ANGLES ± 1°

DRAWN:

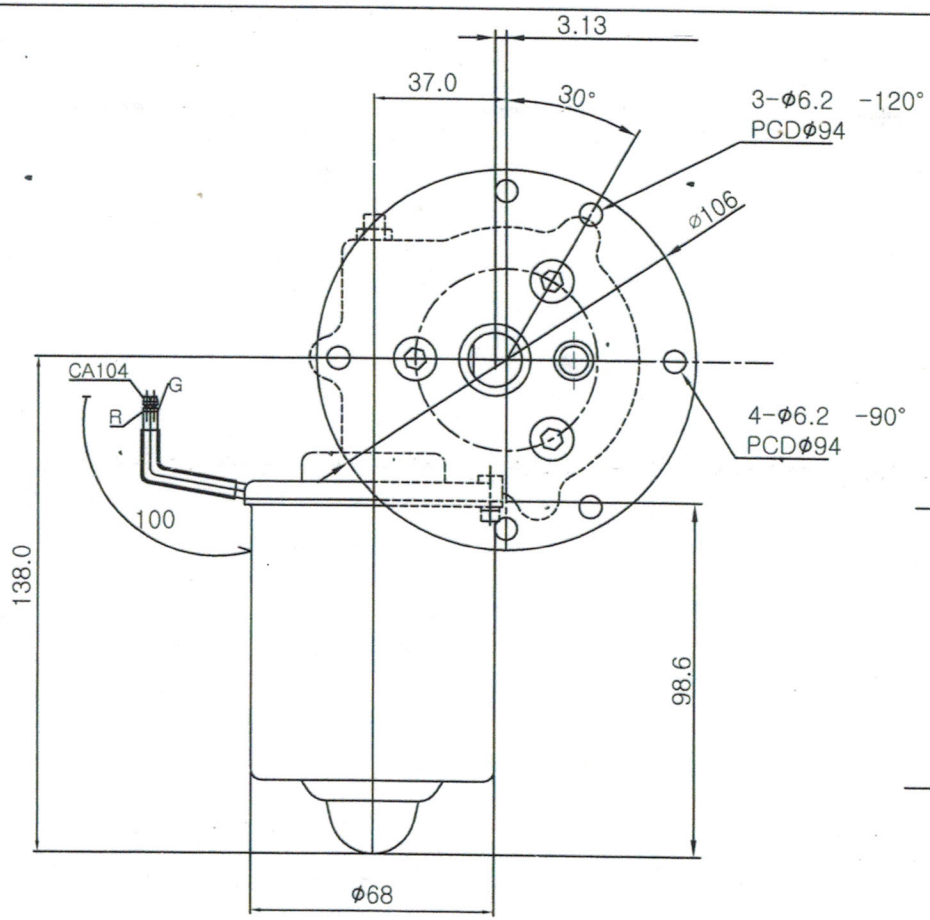
APPROVED:

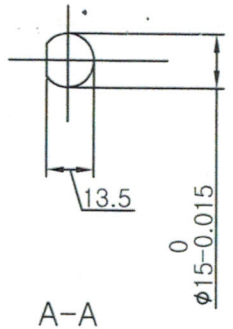
New Creation Consulting

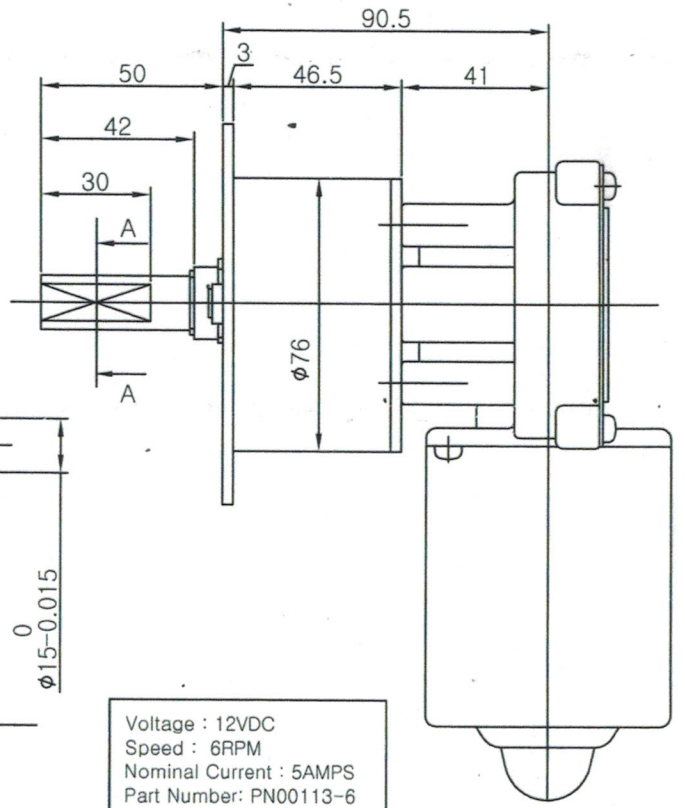
SWING BEARING MNT

SIZE	FSCM NO.	DWG NO.	REV
A			

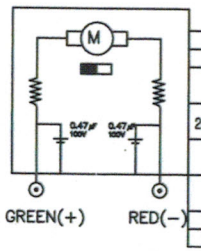
SCALE 1:1	DATE: JUN-29-2014	SHEET







Voltage : 12VDC
Speed : 6RPM
Nominal Current : 5AMPS
Part Number: PN00113-6



RATING VOLTAGE		12V
TESTING VOLTAGE		12V
NO LOAD	SPEED	6.5±2 R.P.M.
	CURRENT	2.5A MAX
200kg-cm LOAD	SPEED	6±2 R.P.M.
	CURRENT	5A MAX

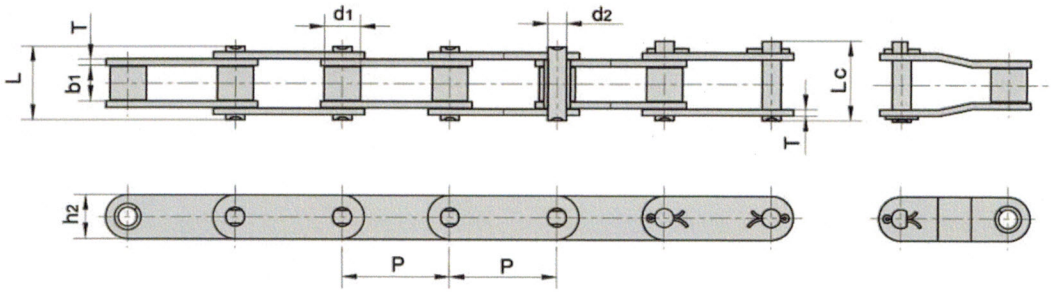
3			
2			
1			

SCALE	UNIT	APPROVED	CHECKED	DRAWN
1 : 1	mm			
FINISH			Date : 5 /26/2016	
MATERIAL				
NAME				
DWG NO:	PN00113-6			

MAKERMOTOR

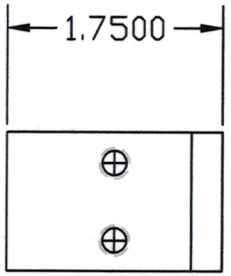
Drive Chain

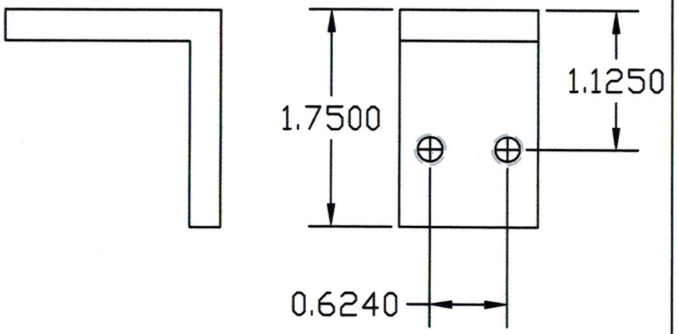
Small Roller Type



ANSI Chain No.	Pitch	Roller Diameter	Width Between Inner Plates	Pin Diameter	Pin Length		Inner Plate Depth	Plate Thickness	Average Tensile Strength	Weight Per Foot
	P	d_1 max	b_1 min	d_2 max	L max	Lc max	h_2 max	T max	lb	lb
C2080H	2.000	0.625	0.620	0.312	1.425	1.551	0.945	0.157	15737	1.702
C2082H	2.000	1.125	0.620	0.312	1.425	1.551	0.945	0.157	15737	2.399
C2100	2.500	0.750	0.744	0.375	1.591	1.760	1.181	0.157	23067	2.017
C2102	2.500	1.562	0.744	0.375	1.591	1.760	1.181	0.157	23067	3.236
C2100H	2.500	0.750	0.744	0.375	1.717	1.846	1.181	0.189	25270	2.385
C2102H	2.500	1.562	0.744	0.375	1.717	1.846	1.181	0.189	25270	3.605

Inner

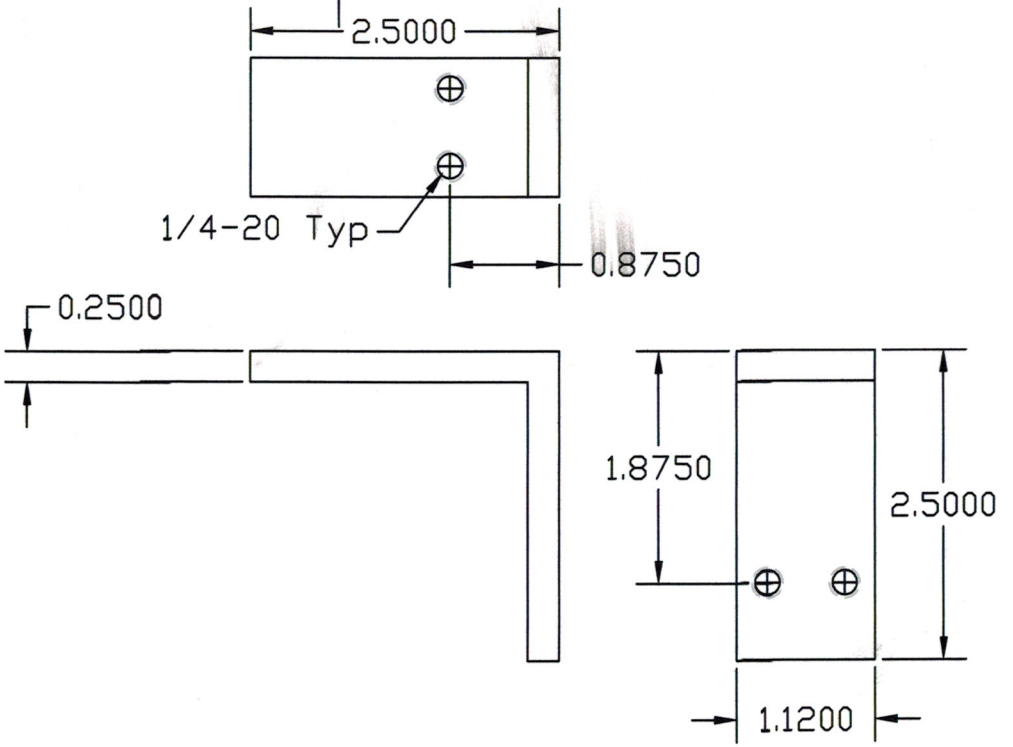




4 each per assy

Outer

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



PRIMARY: millimeter UNLESS OTHERWISE SPECIFIED REMOVE ALL BURRS & BREAK ALL EDGES .25. TOLERANCES PER: X ± .05 X.X ± .02 X.X.X ± .010 ANGLES ± 1°	New Creation Consulting I/O Corner Brackets Swing Assy			
DRAWN	SIZE B	FSCM NO.	DWG NO.	REV
APPROVED	SCALE 1:1	DATE: JUN-29-2014	SHEET	

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
62/604,052	06/22/2017		130			

CONFIRMATION NO. 6725

FILING RECEIPT

Randolph J Putala
1531 Aberdeen Drive
Brentwood, TN 37027

OC000000092705535

Date Mailed: 07/12/2017

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Randolph John Putala, Brentwood, TN;
Michael Sawyer, Westmoreland, TN;

Applicant(s)

Randolph John Putala, Brentwood, TN;
Michael Sawyer, Westmoreland, TN;

Power of Attorney: None

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 07/11/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/604,052**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

LIghted plant grow carousel

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.