

From: [Balcom, Ilia G.](#)
To: [Seiler, Ann](#)
Cc: [SCO; aaron.ray@floridadep.gov; Herrera, Justin H; O Neal, Tommy W](#)
Subject: Duke Energy Hines Energy Complex PA 92-33 Post Certification Submittal Floating Solar Pilot Project
Date: Monday, December 5, 2022 2:22:48 PM
Importance: High

EXTERNAL MESSAGE

This email originated outside of DEP. Please use caution when opening attachments, clicking links, or responding to this email.

Dear Ann,

I hope this email finds you well.

As requested by the Department on the approval of Amendment Request AM22-255, Duke Energy Florida is submitting post certification information of the final design plans of the Floating Solar Pilot Project at the Hines Energy Complex. The information includes final anchoring system design and engineered cross section of the solar panels, along with the TCLP certificate and safety data sheets with additional information. Due to the size of the files, the documents have been saved on the Department's FTP Site for retrieval in the following folder:

<ftp://ftp.dep.state.fl.us/pub/incoming/Duke%20Energy%20Hines/>

The station would like to initiate the construction with the installation of the anchoring system in January 2023.

Please let me know if you have any issues accessing the documents or if any questions.

Have a great day!

Ilia

Ilia G. Balcom
Lead Environmental Specialist
Water Programs, Environmental Services
Duke Energy Florida
Cell: 813-362-5123
Ilia.Balcom@duke-energy.com

NO.	REV.	DESCRIPTION	DATE	BY
1	1	30% PROGRESS SET	09/09/2022	PLM
2	1	30% PROGRESS SET	09/16/2022	PLM
3	1	30% PROGRESS SET	09/16/2022	PLM
4	1	30% PROGRESS SET	10/27/2022	PLM
5	1	30% PROGRESS SET	10/27/2022	PLM
6	1	30% PROGRESS SET	10/27/2022	PLM
7	1	30% PROGRESS SET	10/27/2022	PLM
8	1	30% PROGRESS SET	10/27/2022	PLM
9	1	30% PROGRESS SET	10/27/2022	PLM
10	1	30% PROGRESS SET	10/27/2022	PLM

Kimley-Horn
INCORPORATED
1001 PETERS BLVD, SUITE 200, FARMINGTON, CT 06030
TEL: 860.634.1800
WWW.KIMLEY-HORN.COM

FOR REVIEW

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Kimley-Horn
Call before you dig
800.451.4622
FL ONE CALL CENTER
DIAL 811 OR 800.451.4622
FOR A FREE SERVICE REPORT

DENERGY, LLC
1001 PETERS BLVD, SUITE 200, FARMINGTON, CT 06030
TEL: 860.634.1800
WWW.DENERGY.COM

DENERGY, LLC - E2 - DUKE
ENERGY HIMES COMPLEX
BARTON, FL 32830
7700 CO RD 555
BARTON, FL 32830

CHECKED BY: JCS
DESIGNED BY: LTM
SCALE: AS SHOWN
DATE: 10/27/2022
KHA PROJECT: 1718800

SITE PLAN

PP11-SI-E-01
SHEET NUMBER OF 18
NOT FOR CONSTRUCTION

- GENERAL NOTES**
- CONTRACTOR TO VERIFY EXISTING SITE CONDITIONS AND EQUIPMENT LOCATIONS PRIOR TO STARTING ANY WORK.
 - CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY ON THIS SHEET. CONTRACTOR SHALL VERIFY ALL CONDUIT ROUTING SHALL BE FIELD VERIFIED AND INSTALLED PER REQUIREMENTS.
 - SEE STRING PLAN FOR PV MODULE GROUPINGS.
 - FOR THE SUBMERSIBLE CABLES CONNECTING THE ARRAY TO THE FLOATING ARRAY, THE CONTRACTOR SHALL PROVIDE THE LENGTH BETWEEN THE FLOATS AND SHORE IN CABLE TO ALLOW FOR FLOAT MOVEMENT.

SYSTEM SUMMARY
DC: 101,288 KW
AC: 750 KW

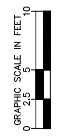
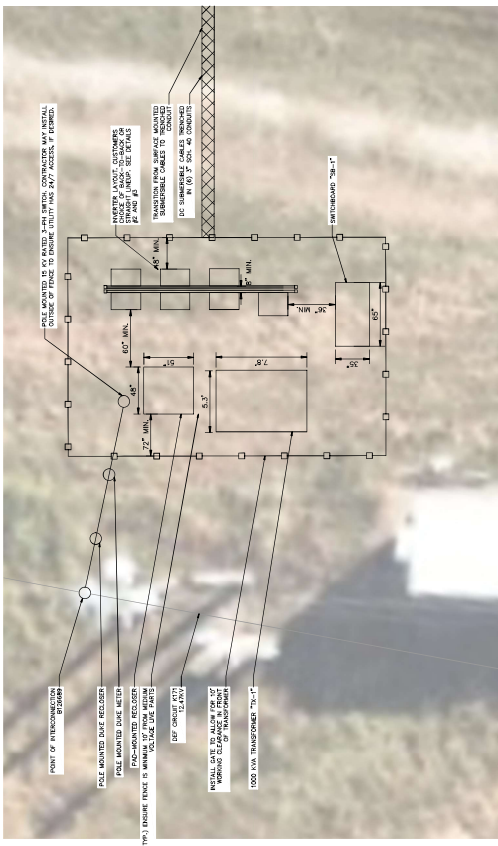
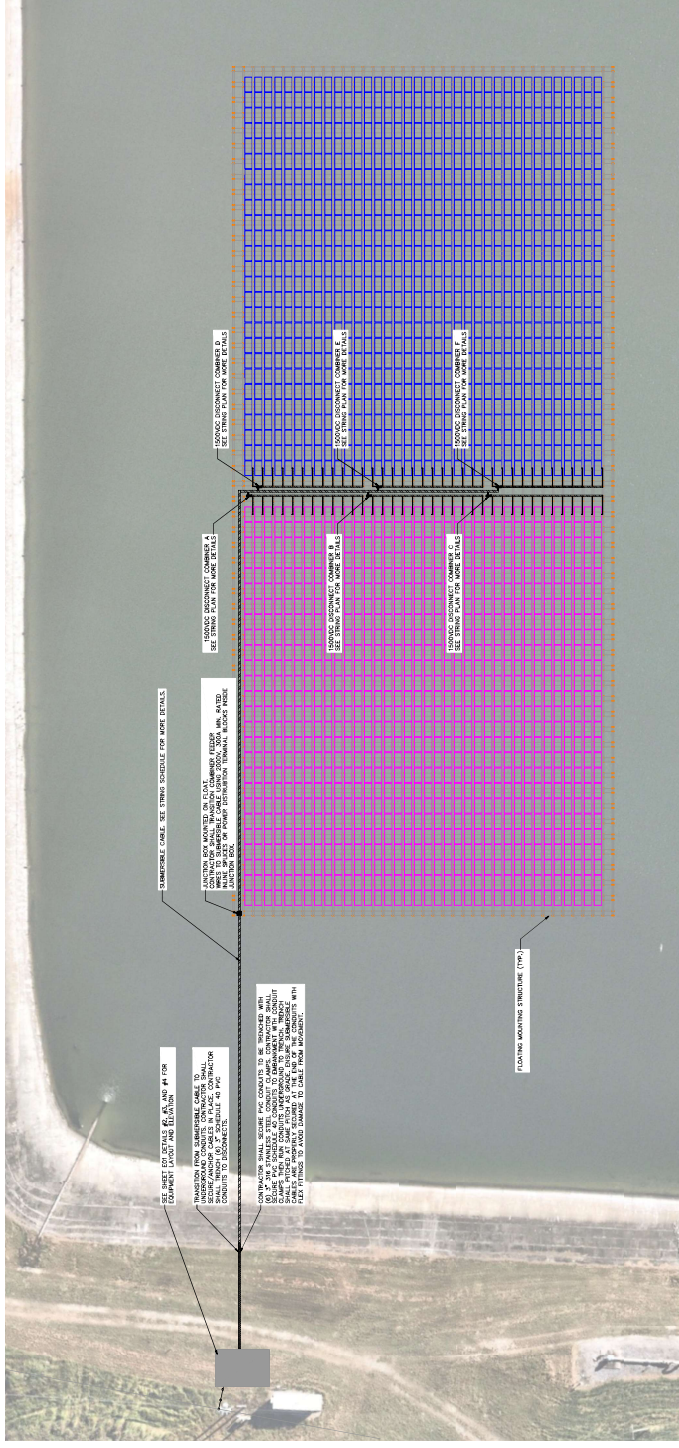
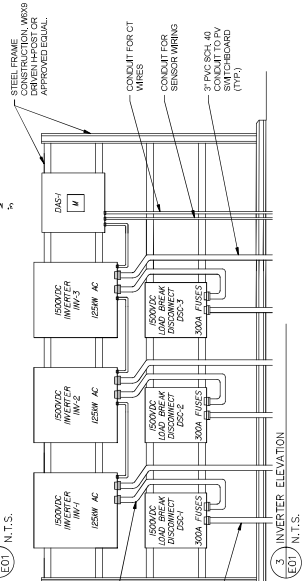
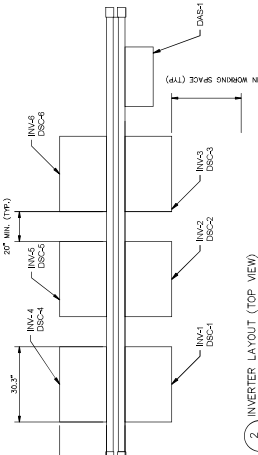
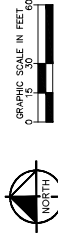
- EQUIPMENT**
- (6) SUNNY HIGH-POWER PEAK3 125-US (SMA) INVERTERS (1872) TIESUN, T1072M/SAW MODULES
 - (6) SUNNY HIGH-POWER PEAK3 125-US (SMA) INVERTERS (1872) TIESUN, T1072M/SAW MODULES
 - (6) SUNNY HIGH-POWER PEAK3 125-US (SMA) INVERTERS (1872) TIESUN, T1072M/SAW MODULES
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LEGEND

XXXXXXXXXX TRENCHED CONDUIT

===== DC CONDUIT/CONDUCTOR PATH

- GENERAL NOTES**
- INVERTERS MAY BE MOUNTED BACK TO BACK ON STEEL MOUNTING FRAME (3 ON EACH SIDE). MAINTAIN MIN. 2' BETWEEN INVERTERS. MAINTAIN MIN. 2' BETWEEN SIDES OF INVERTERS.





BIPRO

TD7G72M **144-cell**

530 - 550W

Bifacial Dual Glass

10BB Half-cut Mono Perc



SYSTEM & PRODUCT CERTIFICATES

- IEC 61215 / IEC 61730 / UL 61703
- ISO 9001: 2015 Quality Management System
- ISO 14001: 2015 Environment Management System
- ISO 45001: 2018 Occupational Health and Safety Management Systems

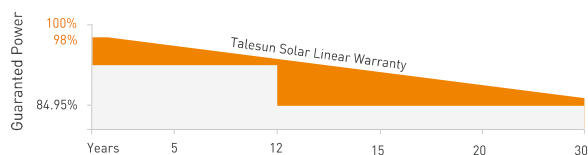


PERFORMANCE WARRANTY



Linear Performance Warranty

Standard Performance Warranty



KEY FEATURES



10BB Half-cut Cell Technology

New circuit design, lower internal current, lower R_s loss
Ga doped wafer, attenuation $< 2\%$ (1st year) / $\leq 0.45\%$ (Linear)



Industry Leading High Yield

Bifacial PERC cell technology,
5%-25% more yield depends on different conditions



Excellent Anti-PID Performance

2 times of industry standard Anti-PID test by TUV SUD



Wider Application

No water-permeability and high wear-resistance,
can be widely used in high-humid, windy and dusty area



IP68 Junction Box

High waterproof level

www.talesun.com

marketing.hq@talesun.com

* GL-EN-Version 2022.01.01

ELECTRICAL CHARACTERISTICS

Testing Condition	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Maximum Power (Pmax/W)	530	395	535	398	540	402	545	406	550	410
Operating Voltage (Vmpp/V)	41.32	38.6	41.48	38.7	41.64	38.8	41.80	39.0	41.96	39.1
Operating Current (Impp/A)	12.83	10.24	12.90	10.30	12.97	10.36	13.04	10.41	13.11	10.47
Open-Circuit Voltage (Voc/V)	49.32	46.4	49.46	46.5	49.60	46.7	49.76	46.8	49.92	47.0
Short-Circuit Current (Isc/A)	13.72	11.06	13.79	11.12	13.86	11.17	13.93	11.23	14.00	11.28
Module Efficiency (%)	20.50		20.60		20.80		21.00		21.20	

STC: Irradiance 1000W/m², Spectra at AM1.5, Module Temperature 25℃, Power output tolerance: 0~+5W, Test uncertainty for Pmax: ±3%

NMOT: Irradiance 800W/m², Spectra at AM1.5, Ambient Temperature 20℃, Wind speed 1m/s

REAR SIDE POWER GAIN(REFERENCE TO 530W FRONT)

Pmax gain	5%	10%	15%	20%	25%
Pmax/W	557	583	610	636	663
Vmpp/V	41.32	41.32	41.32	41.32	41.32
Impp/A	13.47	14.11	14.75	15.40	16.04
Voc/V	49.32	49.32	49.32	49.32	49.32
Isc/A	14.41	15.09	15.78	16.46	17.15

MECHANICAL CHARACTERISTICS

Solar Cell	Monocrystalline 182*182mm
No. of Cells	144 {6*24}
Module Dimensions	2285*1134*35mm {89.96*44.65*1.38inches}
Weight	32.2kg {71lbs.}
Front Glass	2.0mm Coated Tempered Glass
Back Glass	2.0mm Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68, 3 Bypass Diodes
Output Cables	4mm ² (IEC), 12AWG(UL) 300mm in Length or Customized Length
Connectors	T01/LJQ-3-CSY/MC4/MC4-EV02

APPLICATION CONDITIONS

Maximun System Voltage	1500V/DC(IEC)
Operating Temperature	-40℃~+85℃
Maximun Series Fuse	30A
Safety Protection Class	Class II
Mechanical Load	Front side 5400Pa, Back side 2400Pa
Refer. Bifaciality Factor	70%±5%

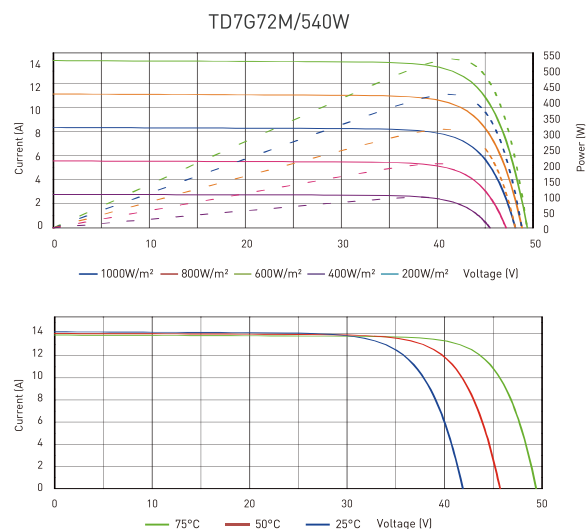
TEMPERATURE CHARACTERISTICS

Temperature Coefficient of Pmax	-0.35%/℃
Temperature Coefficient of Isc	-0.26%/℃
Temperature Coefficient of Voc	+0.048%/℃
Nominal Module Operating Temperature(NMOT)	43±2℃

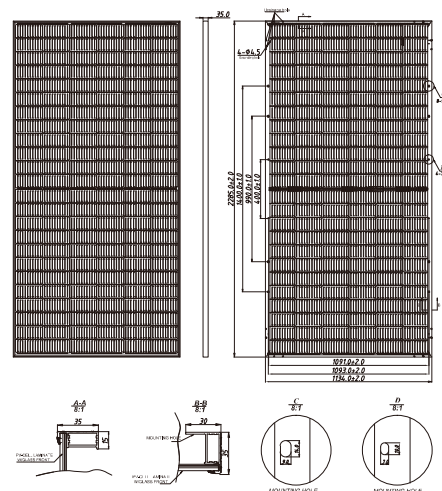
PACKING CONFIGURATION

Pieces Per Pallet	31	31(USA)
Pieces Per Container(40'HQ)	620	558

I-V CURVE



TECHNICAL DRAWINGS



The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to ongoing innovation, R&D enhancement, Suzhou Talesun Solar Technologies Co., Ltd. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

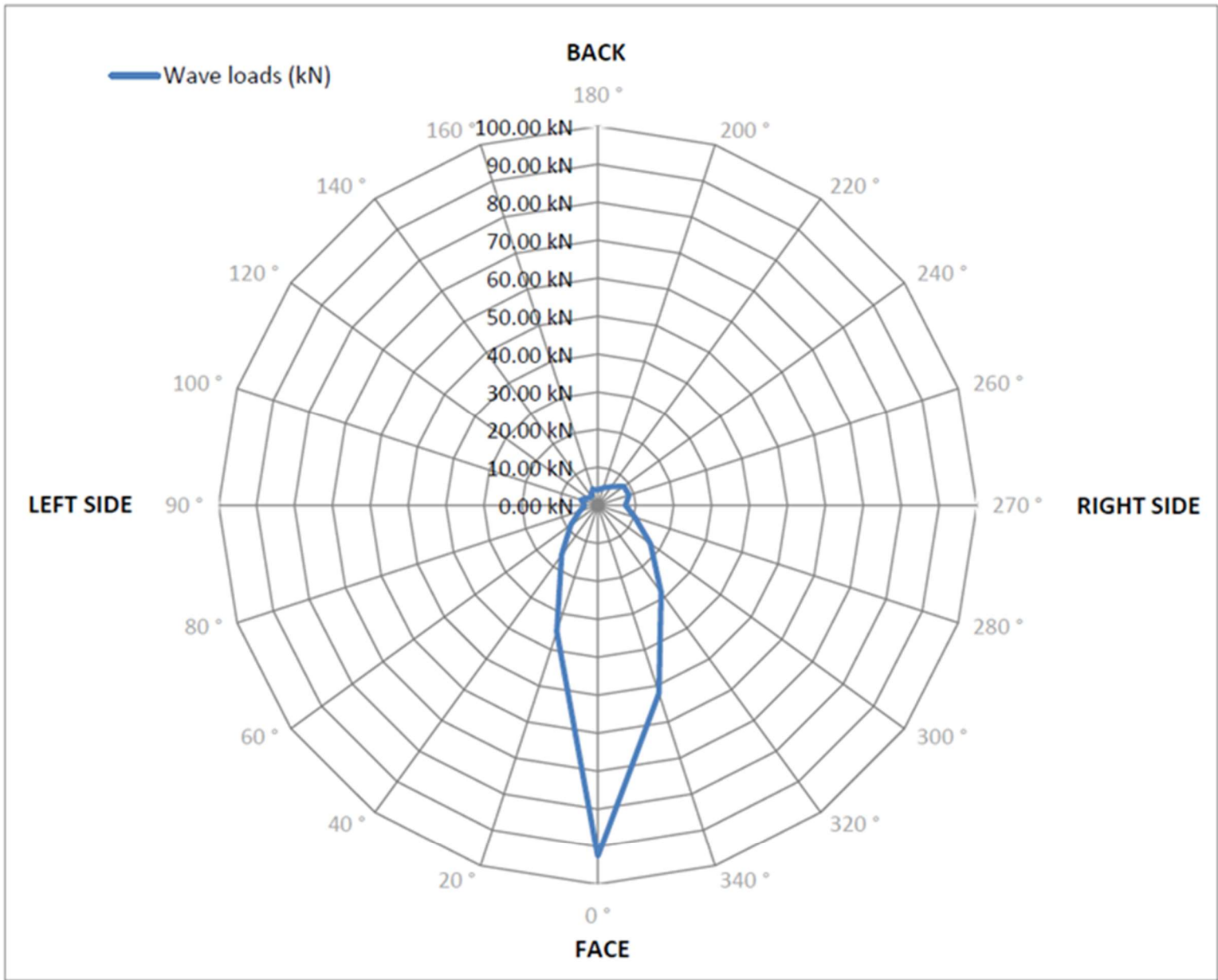


Figure 3: Sketch of Wave loads per direction

Safety Data Sheet

According to Regulation (EC) No 1907/2006, Annex II,
Amended by Regulation (EU) No 453/2010,
According to Regulation (EC) No 1272/2008
RX8401A

SDS Record Number: CSSS-TCO-010-112415
Version 1.0 Revision date: 07/25/2019

Section 1 Identification of the substance and of the company/undertaking

1.1 Product identifier:

Identification on the label/Trade name: Aluminum Paste RX8401A
Additional identification: Not available
Identification of the product: See section 3
Index Number: Not available
REACH registration No.: Not available

1.2 Relevant identified uses of the substance and uses advised against:

1.2.1 Identified uses:

Crystalline silicon solar cell back surface field.

1.2.2 Uses advised against:

Not available.

1.3 Details of the supplier of the safety data sheet:

Supplier(Only representative): Chemical Inspection & Regulation Service Limited
Supplier(Manufacturer): Wuxi Ruxing Technology Development Co., Ltd.
Address: No. 47 Zhang Gong Road, Mei Cun, Wuxi New District, Jiangsu, China
Contact person(E-mail): Wei.Wang (wei.wang@rutech.com)
Telephone: +86 (0)510-8119 2964
Fax: +86 (0)510-8534 6082

1.4 Emergency telephone Number:

+353 41 980 6916

Available outside office hours? YES ☐ NO ☒

Section 2 Hazards Identification

2.1 Classification of the substance or mixture

2.1.1 Classification:

The mixture is classified as following according to 1999/45/EC and REGULATION (EC) No 1272/2008:

REGULATION (EC) No 1272/2008	
Hazard classes/Hazard categories	Hazard statement
Repr. 2	H361

For full text of H- phrases: see section 2.2.

1999/45/EC	
Hazards characteristics	R-Phrases
Repr. Cat. 3	R62-63

For full text of R- phrases: see section 16.

2.1.2 The most important adverse effects

2.1.2.1 The most important adverse physicochemical effects:

Not applicable.

2.1.2.2 The most important adverse human health effects:

Suspected of damaging fertility or the unborn child.

2.1.2.3 The most important adverse environmental effects:

Not applicable.

Safety Data Sheet

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 Version 1.0 Revision date: 07/25/2019

2.2 label elements

Hazard Pictograms:



Signal Word(S):

Warning

Hazard Statement:

H361: Suspected of damaging fertility or the unborn child.

Precautionary Statement:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P281: Use personal protective equipment as required.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P405: Store locked up.

P501: Dispose of contents/container in according with local regulation.

2.3 Other hazards

Not available (PBT, vPvB, Substance is an endocrine disruptor etc.)

Section 3 Composition/information on ingredients

Substance/Mixture: Mixture

Ingredient(s):

Chemical Name	Index No.	Registration No.	CAS No.	EC No.	Concentration
Aluminium powder (stabilised)	013-002-00-1	N/A	7429-90-5	231-072-3	>65%
Diethylene glycol monobutyl ether	603-096-00-8	N/A	112-34-5	203-961-6	15-35%
Lead oxide		N/A	1317-36-8	215-267-0	0.05-2%

Section 4 First aid measures

4.1 Description of first aid measures:

In all cases of doubt, or when symptoms persist, seek medical attention.

4.1.1 In case of inhalation:

Move to fresh air. If breathing difficult, give oxygen. If not breathing, give artificial respiration. Seek medical attention.

4.1.2 In case of skin contact:

Wash skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. If irritation persists, seek medical attention.

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4.1.3 In case of eyes contact:

Wash eyes with copious amount of water for at least 15 minutes. If irritation persists, seek medical attention.

4.1.4 In case of ingestion:

Rinse mouth with water. Do not induce vomiting. Seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Suspected of damaging fertility or the unborn child.

4.3 Indication of any immediate medical attention and special treatment needed

If skin irritation or rash occurs, get medical advice/attention.

Section 5 Fire-Fighting measures

5.1 Extinguishing media:

Suitable extinguishing media: Sand, dry powder, carbon dioxide (CO₂).

Unsuitable extinguishing media: Not available.

5.2 Special hazards arising from the substance or mixture

The product is combustible and may be heated above its flash point during the operation of the product. Emits toxic fumes under fire conditions.

5.3 Advice for fire-fighters:

Wear self-contained breathing apparatus and full protective clothing.

Section 6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

6.1.1 For non-emergency personnel:

Ensure good ventilation/exhaustion at the workplace. Avoid breathing dust. Avoid contact with eyes, skin and clothing.

6.1.2 For emergency responders:

Wear an appropriate NIOSH/MSHA approved respirator if mist, vapor or dust is generated.

6.2 Environmental Precautions:

Do not allow material to be released to the environment without proper governmental permits

6.3 Methods for Containment and Cleaning up:

Use a rag, sand or other materials to absorb all spills immediately upon small amount of leakage. In the presence of severe leakage, evacuate persons from the spill area. Turn off electrical equipment or other sources of ignition if flammable liquids or vapors are present. Wear breathing apparatus, isolate the spill or absorb it with sand and protect the leakage from flowing into drain or soil. Wash the affected area thoroughly and allow adequate ventilation. Leakage residue, cleaning rags and inert materials shall be deemed to be harmful.

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See section 8 for information on personal protection equipment.

See Section 13 for information on disposal.

6.5 Additional information:

Not applicable.

Section 7 Handling and storage

7.1 Precautions for safe handling:

Safety Data Sheet

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Amended by Regulation (EU) No 453/2010,
According to Regulation (EC) No 1272/2008
RX8401A

SDS Record Number: CSSS-TCO-010-112415
Version 1.0 Revision date: 07/25/2019

7.1.1 Protective measures:

Use personal protective equipment. Avoid contact with eyes, skin and clothing. Ensure good ventilation/exhaustion at the workplace. Wash thoroughly after handling.

7.1.2 Advice on general occupational hygiene:

Do not eat, drink and smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a dry, well-ventilated place. Keep container closed when not in use. Store in original containers. Keep away from incompatible materials.

7.3 Specific end use(s):

Not applicable.

Section 8 Exposure control/personal protection

8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available.

8.1.2 Additional exposure limits under the conditions of use: Not available.

8.1.3 DNEL/DMEL and PNEC-Values: Not available.

8.2 Exposure controls

8.2.1 Appropriate engineering controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

8.2.2 Individual protection measures, such as personal protective equipment:

Eye/face protection	Use chemical safety goggles and/or full face shield where splashing is possible.
Hand protection	Wear impervious protective gloves.
Body protection	Wear impervious protective clothing and boots.
Respiratory protection	Apply appropriate respirator according to expected concentration.
Thermal hazards	Wear suitable protective clothing to prevent heat.

8.2.3 Environmental exposure controls:

Avoid discharge into the environment.
According to local regulations, Federal and official regulations.

Section 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Paste
Colour:	Grey
Odour:	Lilac
Odour threshold:	Not available
pH:	Not available
Melting point/range (°C):	< -70°C(1 atm)(Diethylene glycol monobutyl ether)
Boiling point/range (°C) :	Not available
Flash point (°C) :	86°C (Closed Cup)
Evaporation rate:	Not available
Flammability (solid, gas);	Not available
Ignition temperature (°C) :	Not available
Upper/lower flammability/explosive limits:	Not available

Safety Data Sheet

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Vapour pressure (20°C) :	Not available
Vapour density:	Not available
Relative Density (25°C):	Not available
Bulk density (kg/m ³) :	1.7~2.2g/ml
Water solubility (g/l) at 20°C :	Insoluble
n-Octanol/Water (log Po/w) :	Not available
Auto-ignition temperature:	210°C (Diethylene glycol monobutyl ether)
Decomposition temperature:	Not available
Viscosity, dynamic (mPa s) :	Not available
Explosive properties:	Not available
Oxidising properties:	Not available

9.2. Other information:

Fat solubility(solvent– oil to be specified) etc:	Not available
Surface tension:	Not available
Dissociation constant in water(pKa):	Not available
Oxidation-reduction Potential:	Not available

Section 10 Stability and reactivity

10.1 Reactivity:

The substance is stable under normal storage and handling conditions.

10.2 Chemical stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

10.3 Possibility of hazardous reactions:

No dangerous reactions known.

10.4 Conditions to avoid:

Incompatible materials.

10.5 Incompatible materials:

Acid, oxidizer, reductant, metal, inflammable material.

10.6 Hazardous decomposition products:

Carbon monoxide, carbon dioxide.

Section 11 Toxicological information

11.1 Toxicokinetics, metabolism and distribution

Non-human toxicological data: Not available

11.2 Information on toxicological effects

Acute toxicity:

LD50(Oral, Mouse):	2410 mg/kg bw (male, Diethylene glycol monobutyl ether)
LD50(Dermal, Rabbit):	Not available
LC50(Inhalation, Rat):	> 29ppm/2h (Diethylene glycol monobutyl ether)

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Skin corrosion/Irritation:	Not classified
Serious eye damage/Irritation:	Not classified
Respiratory or skin sensitization:	Not classified
Germ cell mutagenicity:	Not classified
Carcinogenicity:	Not classified
Reproductive toxicity:	Suspected of damaging fertility or the unborn child.
STOT- single exposure:	Not classified
STOT-repeated exposure:	Not classified
Aspiration hazard:	Not classified

Section 12 Ecological information

Toxicity: Diethylene glycol monobutyl ether(CAS# 112-34-5)

Acute toxicity	Time	Species	Method	Evaluation	Remarks
LC50 1300 mg/l	96h	Fish	OECD 203	N/A	N/A
EC50 >100 mg/l	48h	Daphnia	OECD 202	N/A	N/A
EC50 >100 mg/l	72h	Algae	OECD 201	N/A	N/A

Persistence and degradability:	Not available.
Bioaccumulative potential:	Not available.
Mobility in soil:	Not available.
Results of PBT&vPvB assessment:	Not available.
Other adverse effects:	Not available.

Section 13 Disposal considerations

13.1 Waste treatment methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

13.2 Product / Packaging disposal:

If empty container retains product residues, all label precautions must be observed. Return for reuse or dispose according to national or local regulations.

Section 14 Transport information

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO/IATA)
UN-Number:	Not regulated	Not regulated	Not regulated
UN Proper shipping name:	Not regulated	Not regulated	Not regulated
Transport hazard Class:	Not regulated	Not regulated	Not regulated
Packaging group:	Not regulated	Not regulated	Not regulated
Environmental hazards:	No	No	No
Special precautions for user:	See section 2.2	See section 2.2	See section 2.2

Safety Data Sheet

According to Regulation (EC) No 1907/2006, Annex II,
Amended by Regulation (EU) No 453/2010,
According to Regulation (EC) No 1272/2008
 RX8401A

SDS Record Number: CSSS-TCO-010-112415
 Version 1.0 Revision date: 07/25/2019

<i>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</i>	Not regulated	Not regulated	Not regulated
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Section 15 Regulation information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant information regarding authorization:

Not applicable.

Relevant information regarding restriction:

Not applicable.

Other EU regulations:

Employment restrictions concerning young person must be observed. For use only by technically qualified individuals.

Other National regulations:

Not applicable

Chemical Safety Assessment has been carried out?

YES

☐

NO

☒

Section 16 Other information

16.1 Indication of changes

Version 1.2 Classification has been updated on 11 OCT 2013.

16.2 Relevant R- phrases (number and full text):

R62-63: Possible risk of impaired fertility. Possible risk of harm to the unborn child.

16.3 Training instructions:

Not applicable.

16.4 Further information:

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

16.5 Notice to reader:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees.

This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Shanghai Huitian New Chemical Co.,Ltd

Material Safety Data Sheet

No.251 wenji Rd,Songjiang District of Shanghai
Telephone:86-21-57743399 Fax: 86-21-37740088

1. IDENTIFICATION OF THIS PRODUCT AND THE COMPANY

Product Name: HT906Z Silicone Adhesive Sealant

Company Details:

Manufacturer/Supplier: Shanghai Huitian New Chemical Co.,Ltd

Address: No.251 wenji Rd,Songjiang District of Shanghai

Telephone Number: (86 21) 57743399

Fax Number: (86 21) 37740088

Emergency Telephone Number: (86 21) 57743399

Contact Person: Technical Services Engineer

2. HAZARDS IDENTIFICATION

Overall Hazard Classification:	Not hazardous.
Hazard Information:	Not hazardous. Avoid contact with skin and eyes.
Route of Exposure:	Skin Contact and Accidental Ingestion.
Possible Health Effects:	
Acute	
Eyes:	Direct contact may cause temporary redness and discomfort.
Skin:	No significant irritation expected from a single short-term exposure.
Inhalation:	No significant effects expected from a single short-term exposure.
Ingestion:	Low ingestion hazard in normal use.
Chronic:	
Skin:	No known applicable information.
Inhalation:	No known applicable information.
Ingestion:	Repeated ingestion or swallowing large amounts may injure internally.
Signs and Symptoms of	No significant adverse effects from a single exposure expected from normal
Overexposure:	use.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS No.</u>	<u>% (w/w)</u>
Polydimethylsiloxane	63148-60-7	30-60

Vinyltris(methylethylketoxime)silane	2224-33-1	5-10
calcium carbonate	471-34-1	30-60
Aminopropyltriethoxysilane	919-30-2	<5
Else		<1
4、FIRST AID MEASURES		
Eyes:	Immediately flush with water.	
Skin:	No first aid should be needed.	
Inhalation:	No first aid should be needed.	
Ingestion:	Get medical attention.	
Comments:	Treat symptomatically.	
Note to physicians:	Treat symptomatically. For further information, the medical practitioners should contact Hui Tian (Shanghai) Co. Ltd.	

5、FIRE FIGHTING MEASURES	
Flammability:	Combustible.
Flash Point:	Not applicable
Autoignition temperature:	Not determined.
Lower Flammability Limit:	Not determined.
Upper Flammability Limit:	Not determined.
Hazardous Properties:	None.
Extinguishing Media:	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO ₂), dry chemical or water spray. Water can be used to cool fire exposed containers.
Special Fire Fighting:	Self-contained breathing apparatus and protective clothing should be worn in
Procedures and Equipment:	Fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool
Hazardous Combustion Products:	Silicon oxides. Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.
Unsuitable Extinguishing Media:	None established

6、ACCIDENTAL RELEASE MEASURES	
Personal Precautions:	Avoid eye contact. Do not take internally.

Environmental Precautions:	Prevent from spreading or entering into drains, ditches or rivers by using sand, earth or other appropriate barriers.
Methods for Cleaning up:	Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protective equipment recommendations described in this MSDS. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since some silicone materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which laws and regulations are applicable.

7、HANDLING AND STORAGE

Handling Precautions:	Use with adequate ventilation. Avoid eye contact. Do not take internally. Exercise good industrial hygiene practice. Wash after handling, especially before eating, drinking or smoking.
Storage Conditions:	Use reasonable care and store away from oxidizing materials.
Unsuitable Packaging Materials:	None established.

八、EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:	No respiratory protection should be needed.
Eye protection:	Use proper protection - safety glasses as a minimum.
Skin protection:	Washing at mealtime and end of shift is adequate
Precautionary Measures:	Avoid eye contact. Do not take internally. Use reasonable care.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions

九、PHYSICAL AND CHEMICAL PROPERTIES

Physical Form:	Paste
Color:	White
Odor:	Not available.
pH:	Not determined.

Solubility in Water:	Not determined.
Boiling Point:	Not determined.
Melting Point:	Not determined.
Flash Point:	Not applicable
Autoignition temperature:	Not determined.
Explosive properties:	No
Oxidizing properties:	No
Vapor Pressure @ 25°C:	Not determined.
Specific Gravity:	1.35~1.38
Vapour Density (air=1):	Not determined.
Viscosity:	Not determined.
Molecular Weight:	Not determined.
The above information is not intended for use in preparing product specifications. Contact Hui Tian before writing specifications.	

10、STABILITY AND REACTIVITY	
Stability:	Stable.
Reactivity Conditions to Avoid:	None.
Materials to Avoid:	Oxidizing material can cause a reaction.
Hazardous Decomposition Products:	Silicon oxides. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.
Quartz Metal oxides Hazardous	Hazardous polymerization will not occur.

10、STABILITY AND REACTIVITY	
Stability:	Stable.
Reactivity Conditions to Avoid:	None.
Materials to Avoid:	Oxidizing material can cause a reaction.
Hazardous Decomposition Products:	Silicon oxides. Carbon oxides and traces of incompletely burned carbon compounds. Formaldehyde.
Quartz. Metal oxides. Hazardous :	Hazardous polymerization will not occur.

11、TOXICOLOGICAL INFORMATION
Not included in the list about carcinogen in IARC.

May cause skin allergies.

12、ECOLOGICAL INFORMATION

Environmental Fate and Distribution:	Siloxanes are removed from water by sedimentation or binding to sewage sludge. In soil, siloxanes are degraded.
Environmental Effects:	No adverse effects on aquatic organisms.
Bioaccumulation:	No bioaccumulation potential.

13、DISPOSAL CONSIDERATIONS

Product Disposal:	Dispose of in accordance with local regulations.
Packaging Disposal:	Dispose of in accordance with local regulations.

14、TRANSPORT INFORMATION

Road and Rail Transport:	Not assessed.
Sea Transport (IMDG):	Not subject to IMDG code.
Air Transport (IATA):	Not subject to ICAO regulations.
UN No.:	N/A

十五、REGULATORY INFORMATION

Applicable Laws:	Provisions of the Regulations for the Safe Handling of Chemicals in the Workplace, particularly those relating to the safe use, production, storage and transportation of dangerous chemicals.
Chemical Inventories:	
AICS:	All ingredients listed or exempt.
DSL:	All chemical substances in this material are included on or exempted from the DSL
IECSC:	All ingredients listed or exempt.
MITI:	All components are listed on ENCS or its exempt rule.
KECL:	All ingredients listed, exempt or notified.
EINECS:	All ingredients listed or exempt.
TSCA:	All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.
PICCS:	All ingredients listed or exempt.

十六、OTHER INFORMATION

Packaging unit:	310ml/200kg
Contact Point:	Technical Services Engineer (86-21) 57743399

Prepared by:

Shanghai Huitian New Chemical Co.,Ltd

This information is offered in good faith as typical values and not as a product specification. No warranty, expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

Material Safety Data Sheet

Changzhou Fusion New Material Co., Ltd.

Product Name: CSP-M3H3

Issue Date: 03/27/2020

Edition: 1.0

Changzhou Fusion New Material Company encourages and expects you to read and understand the entire MSDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/ UNDERTAKING

1.1. Product name: CSP-M3H3

1.2. Relevant identified uses of the substance or mixture and uses advised against

- A. Relevant identified uses: Electrode materials for photovoltaic device.
- B. Uses advised against: Not available

1.3. Details of the supplier of the safety data sheet

- A. Name of manufacture/supplier: Changzhou Fusion New Material Corp.,Ltd.
- B. Address: Building B, No.1 Shuangbang Road, Xujing Town, Qingpu District, Shanghai, PRC
- C. Telephone: +86-21-39889681
- D. Fax: +86-21-39889680
- E. Email: Alex@fusion-cz.com
- F. Website: <http://www.fusion-cz.com>

1.4. Emergency telephone numbers

Telephone number: +86-0181-1260-0123

2. HAZARD IDENTIFICATION

2.1. Classification of the substance or mixture

A. Classification(in accordance with EC No. 1272/2008):

Skin Corrosion/Irritation Category 2

Eye Irritation Category 2A

Specific target organ toxicity(single exposure) Category 3

Acute Aquatic Hazard Category 1

B. Classification(in accordance with 1999/45/EC): Not classified

R36/37/38 • Irritating to eyes, respiratory system and skin.

R52 • Harmful to aquatic organisms.

R58 • May cause long-term adverse effects in the environment.

R67 • Vapours may cause drowsiness and dizziness.

2.2. Label elements

- Symbol(s)



- Signal word: WARNING

- Hazard statement(s):

H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H400	Very toxic to aquatic life

- Precautionary statement(s):

P264	Wash thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P302+P352	If on skin: Wash with plenty of soap and water.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.

P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P304+P340	If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P391	Collect spillage.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulation.

2.3. Other hazards

No relevant data

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Mixture

Information on ingredients

Chemical name	Synonym	CAS No.	WT(%)	Classification 67/548/EEC	Classification 1272/2008/EC
Ag Powder	Silver	7440-22-4	80-90	N; R50	Aquatic. Acute 1
Glass Frit			1-10		
Butyl Carbitol Acetate	Diethylene glycol butyl ether acetate	124-17-4	1-10	Xi; R36, R37, R38	Eye Irrit. 2 STOT SE 3 Skin Irrit. 2
Proprietary ingredients		NA	Trade Secret	-	-

4. FIRST AID MEASURES

4.1. Description of first aid measures

A. Ingestion:

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a

doctor.

B. Eye Contact:

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

C. Skin Contact:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

D. Inhalation:

- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

4.2. Most important symptoms and effects, both acute and delayed

A. Acute effects:

- Inhalation: Inhalation of vapours may cause drowsiness and dizziness.
- Ingestion : Excessive oral doses irritate the gastro-intestinal tract and may cause nausea, vomiting and diarrhoea.
- Skin: The material produces moderate skin irritation.
- Eye: Temporary impairment of vision and/or other transient eye damage may occur.

B. Delayed effects: No relevant information found

4.3. Indication of any immediate medical attention and special treatment needed

- Treatment may vary with condition of victim and specifics of incident.

5. FIRE FIGHTING MEASURES

5.1. Extinguishing media

- Suitable extinguishing media: dry sand, graphite powder, dry sodium chloride.
- Unsuitable extinguishing media: WATER, CO₂ or FOAM

5.2. Special hazards arising from the substrate or mixture

- Fire Incompatibility: May produce toxic and/or corrosive fumes.

5.3. Advice for fire-fighters

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use..

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Clear area of personnel and move upwind.
- Wear breathing apparatus plus protective gloves.
- Stop leak if safe to do so.

6.2. Environmental precautions

- Spills should be collected to prevent contamination of waterways.
- Keep out of irrigation ditches, sewers, and water supplies.
- If large spills, advise emergency services.
- Dispose in accordance with The Waste Control Law.

6.3. Methods and material for containment and cleaning up

- Clean up all spills immediately.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste disposal.
- Prevent, by any means available, spillage from entering drains or water course.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.

6.4. Reference to other sections:

- Refer to "Section 8 Exposure controls/personal protection" and "Section 13 Disposal consideration" as appropriate.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

7.2. Conditions for safe storage, including any incompatibilities

- Store in cool, dry and well-ventilated place
- Keep containers securely sealed when not in use.

7.3. Specific end use(s) : Not available

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Chemical name	European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs)
silver (Silver, metallic)	TWA 0.1 mg/m ³

8.2. Exposure controls

A. Appropriate engineering controls:

A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

B. Individual protection measures, such as personal protective equipment:

- Respiratory Protection: Use the respirator be given official approval by Chinese Occupational Safety & Health Agency. Under conditions of frequent use or heavy exposure, Respiratory protection may be needed. Respiratory protection is ranked in

order from minimum to maximum. Consider warning properties before use.

※ When take shelter (If liquid)

- Any chemical cartridge respirator with organic vapour cartridge(s).
- Any chemical cartridge respirator with a full facepiece and organic vapour cartridge(s).
- Any air-purifying respirator with a full facepiece and an organic vapour canister.

※ For Unknown Concentration or Immediately Dangerous to Life or Health

- Self-contained breathing apparatus (pressure-demand or other positive-pressure mode in combination)
- Supplied-air respirator with full facepiece
- Eye Protection: Wear primary eye protection such as splash resistant safety goggles with a secondary protection faceshield. Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Hand Protection: Wear chemical resistant protected gloves.
- Body Protection: Wear chemical resistant protected clothing.

C. Environmental Exposure Controls: Not available

8.3. DNEL, PNEC, OEL, EQS and DMEL values : Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

- A. Appearance : Gray viscous liquid
- B. Odour : Not available
- C. Odour threshold : Not available

9.2. Important health, safety and environmental information:

- A. pH: Not available
- B. Boiling point/boiling range: Not available
- C. Melting point: Not available
- D. Flash point: Not available
- E. Flammability (solid, gas): Not available
- F. Explosive properties: Not available
- G. Oxidizing properties: Not available
- H. Vapour pressure: Not available
- I. Relative density: Not available
- J. Solubility: Not available
- K. Water solubility: Not available
- L. Partition coefficient: Not available

- M. Viscosity: Not available
- N. Vapour density: Not available
- O. Evaporation rate: Not available

9.3. Other information:

Autoignition Temperature: Not available

10. STABILITY AND REACTIVITY

10.1. Stability

- Stable at room temperature in a closed container

10.2. Possibility of Hazardous Reaction

- Will not occur.

10.3. Conditions to avoid

- Avoid heat, flame, spark and other ignition sources
- Avoid contact with incompatible materials.

10.4. Materials to avoid

- strong acids, bases, oxidizing agents etc.

10.5. Hazardous decomposition products

- May produce toxic and/or corrosive fumes.

11. TOXICOLOGICAL INFORMATION

11.1. Potential acute health effects

- A. Inhalation: May cause respiratory irritation. May cause drowsiness or dizziness.
- B. Ingestion: Not available.
- C. Eye contact: Causes serious eye irritation.
- D. Skin contact: Causes skin irritation.

11.2. Toxicity and irritation:

- A. Acute toxicity:
 - Oral:
 - [Silver] : LD50 > 5,000 mg/kg Rat
 - [Diethylene glycol butyl ether acetate] : LD50 > 2,340 mg/kg Rat
 - Dermal:

- [Silver] : LD50 > 2,000 mg/kg Rat
- [Diethylene glycol butyl ether acetate] : LD50 = 5,400mg/kg, rabbit
- Inhalation:
 - [Diethylene glycol butyl ether acetate] : Steam LC50 > 400 ppm 4h Rat
- B. Skin corrosion/irritation: Causes skin irritation
- C. Eye corrosion/irritation: Causes serious eye irritation
- D. Respiratory sensitization: Not available
- E. Skin Sensitization: Not available
- F. Carcinogenicity:
 - Not classify to be carcinogenic substance (A1) and carcinogenic substance of presumed (A2) in Public notice.
 - NTP, IARC, OSHA: Not classified
- G. Mutagenicity: Not available
- H. Reproductive toxicity:
- I. Specific target organ toxicity(single exposure): May cause respiratory irritation. May cause drowsiness or dizziness
- J. Specific target organ toxicity(repeated exposure):
- K. Aspiration hazard: Not available

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity:

- A. Acute aquatic toxicity
 - Fish:
 - [Silver] : LC50 = 58 mg/l 96 hr
 - [Diethylene glycol butyl ether acetate] : LC50 = 50-70 mg/l 96 hr Brachydanio rerio
 - Crustaceans:
 - [Diethylene glycol butyl ether acetate] : EC50 ≥ 644 mg/l 48 hr Daphnia magna
 - Algae:
 - [Diethylene glycol butyl ether acetate] : EC50 = 1,570 mg/l 72 hr Pseudokirchneriella subcapitata

12.2. Mobility:

Butyl Carbitol Acetate : HIGH

12.3. Persistence/degradability:

Butyl Carbitol Acetate : HIGH

12.4. Bioaccumulative potential:

Butyl Carbitol Acetate : LOW

12.5. Results of PBT assessment: Not available

12.6. Other adverse effects: Not available

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

- The user of this product must properly characterize the waste/container generated from the use of this product in accordance with all applicable federal, state and/or local laws and regulations in order to determine the proper disposal of the waste in accordance with all applicable federal, state and/or local laws and regulations.
- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with local regulation.

13.2. Additional information: Not available

14. TRANSPORTATION INFORMATION

14.1. UN number: Not applicable

14.2. UN proper shipping name: Not applicable

14.3. Transport hazard class(es): Not applicable

14.4. Packing group: Not applicable

14.5. Environmental hazard: Not applicable

14.6. Special precautions for user related to transport or transportation measures: Not available

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulation / legislation specific for the substance or mixture

Labelling in accordance with 1999/45/EC

Hazard Symbol or Symbols:



Risk Phrases:

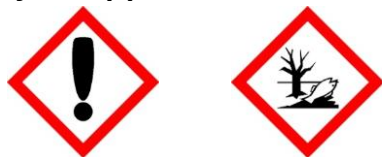
- R36/37/38 Irritating to eyes, respiratory system and skin.
 R52 Harmful to aquatic organisms.
 R58 May cause long-term adverse effects in the environment.
 R67 Vapours may cause drowsiness and dizziness.

Safety Phrases

- S17 Keep away from combustible material.
 S23 Do not breathe gas/fumes/vapour/spray.
 S24 Avoid contact with skin.
 S39 Wear eye/face protection.
 S401 To clean the floor and all objects contaminated by this material, use water and detergent.
 S26 In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
 S46 If swallowed, IMMEDIATELY contact Doctor or Poisons Information Centre. (show this container or label).

Regulatory information on labelling according to 1272/2008 Regulation (EC)Symbol(s)

- Symbol(s)



- Signal word: WARNING

- Hazard statement(s):

- H315 Causes skin irritation
 H319 Causes serious eye irritation
 H335 May cause respiratory irritation
 H336 May cause drowsiness or dizziness
 H400 Very toxic to aquatic life

- Precautionary statement(s):

- P264 Wash thoroughly after handling.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 P271 Use only outdoors or in a well-ventilated area.
 P273 Avoid release to the environment.
 P302+P352 If on skin: Wash with plenty of soap and water.
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P362 Take off contaminated clothing and wash before reuse.
 P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313	If eye irritation persists: Get medical advice/attention.
P304+P340	If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P391	Collect spillage.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulation

15.2. Chemical Safety Assessment: Not conducted

16. OTHER INFORMATION

16.1. Full text of H-Statements referred to under section 3

H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H400	Very toxic to aquatic life

16.2. Full text of R-phrases referred to under sections 2 and 3

R36/37/38	Irritating to eyes, respiratory system and skin.
R52	Harmful to aquatic organisms.
R58	May cause long-term adverse effects in the environment.
R67	Vapours may cause drowsiness and dizziness.

16.3. Update history:

Date of issue: 01/18/2016
Date of revision:

16.4. Others

Although the information contained in this document is presented in good faith, base on available information believed to be reliable at the time of preparation of this document, Changzhou Fusion New Material Corp., Ltd. makes no warranties or representations with respect to the information or the products described herein, and expressly disclaims all implied warranties and conditions (including all warranties and conditions of merchantability or fitness for a particular purpose). This information is subject to change without notice.

Responsibility for use, storage, handling and disposal of the products described herein, whether alone or in combination with any other substance, is that of the purchaser and/or end user.

Test Report

REPORT No.: SHE21-12394 R1 **DATE RECEIVED:** 2021/11/02

ATTENTION: - **ANALYSIS DATE :** 2021/11/02~2021/11/24

CUSTOMER: Talesun Technologies (Thailand)Co., Ltd. **DATE REPORTED:** 2021/11/25

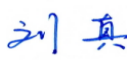
ADDRESS: 7/473 Moo.6 Mabyangporn, Pluakdaeng, Rayong 21140, Thailand. **SAMPLE (S):** Other(solid)(1)

REFERENCE: -

REMARKS

- 1.The results apply to the sample(s) as received
- 2.The report is translated from SHE21-12394 R0

Edited by: 
Yaxiong ZHAO

Reviewed by: 
Zhen LIU

Approved by: 
Liqiong TANG



Statement

1. The test report is invalid without the official seal of the laboratory.
2. This test report cannot be reproduced in any way, except in full content, without prior approval in writing by the laboratory.
3. The test report is invalid without the signature of the compiler, the checker and the approver
4. The test report is invalid if altered.
5. The test report has been drafted in Chinese and translated into English (if applicable) for convenience only. In the event of discrepancy, the Chinese version shall prevail.
6. The sample type, sample name, sample description, project name and other information of the submitted samples are provided by the client. The representativeness and authenticity of the samples are in the charge of the client.
7. The report is for internal reference only if it is not stamped with CMA mark, it has no proof function to the society.
8. Should you have any queries or objection to the test report, please contact us within 10 days after receiving the report.



INORGANIC & ORGANIC ANALYSIS

Report No.: SHE21-12394 R1

Customer Reference: -

		Lab ID		SHE21-12394.001	
		Customer ID		PV MODULE 光伏组件	
		Model No.		TD7G72M	
		Order No.		SHES2110021145TX	
		Serial No.		MB01211010499999	
		Date Received		2021/11/02	
		Limit			
TCLP ITEM	METHOD	MDL	UNIT		Other(solid)
Arsenic (As)	USEPA 200.8-1994	0.050	mg/L	≤5	<0.050
Barium (Ba)	USEPA 200.8-1994	0.010	mg/L	≤100	0.060
Cadmium (Cd)	USEPA 200.8-1994	0.001	mg/L	≤1	<0.001
Chromium (Cr)	USEPA 200.8-1994	0.010	mg/L	≤5	0.011
Lead (Pb)	USEPA 200.8-1994	0.010	mg/L	≤5	0.013
Selenium (Se)	USEPA 200.8-1994	0.050	mg/L	≤1	<0.050
Silver (Ag)	USEPA 200.8-1994	0.010	mg/L	≤5	<0.010
Mercury (Hg)	USEPA 7473-2007	0.005	mg/L	≤0.2	<0.005
2,4-D	USEPA 8151A-1996	0.0005	mg/L	≤10	<0.0005
2,4,5-TP (Silvex, Fenopop)	USEPA 8151A-1996	0.0005	mg/L	≤1	<0.0005
Benzene	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
Carbon tetrachloride	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
Chlorobenzene	USEPA 8260D-2018	0.0005	mg/L	≤100	<0.0005
Chloroform	USEPA 8260D-2018	0.0005	mg/L	≤6	<0.0005
1,4-Dichlorobenzene	USEPA 8260D-2018	0.0005	mg/L	≤7.5	<0.0005
1,2-Dichloroethane	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005
1,1-Dichloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.7	<0.0005
2-butanone(MEK)	USEPA 8260D-2018	0.020	mg/L	≤200	<0.020
Tetrachloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.7	<0.0005
Trichloroethene	USEPA 8260D-2018	0.0005	mg/L	≤0.5	<0.0005



INORGANIC & ORGANIC ANALYSIS

Report No.: SHE21-12394 R1

Customer Reference: -

		Lab ID		SHE21-12394.001	
		Customer ID		PV MODULE 光伏组件	
		Model No.		TD7G72M	
		Order No.		SHES2110021145TX	
		Serial No.		MB01211010499999	
		Date Received		2021/11/02	
TCLP ITEM	METHOD	MDL	UNIT	Limit	Other(solid)
Vinyl chloride	USEPA 8260D-2018	0.0005	mg/L	≤0.2	<0.0005
2,4-Dinitrotoluene	USEPA 8270E-2018	0.0005	mg/L	≤0.13	<0.0005
Hexachlorobenzene	USEPA 8270E-2018	0.0005	mg/L	≤0.13	<0.0005
Hexachlorobutadiene	USEPA 8270E-2018	0.0005	mg/L	≤0.5	<0.0005
Hexachloroethane	USEPA 8270E-2018	0.0005	mg/L	≤3	<0.0005
Nitrobenzene	USEPA 8270E-2018	0.0005	mg/L	≤2	<0.0005
Pentachlorophenol	USEPA 8270E-2018	0.0025	mg/L	≤100	<0.0025
Pyridine	USEPA 8270E-2018	0.002	mg/L	≤5.0	<0.002
2,4,5-Trichlorophenol	USEPA 8270E-2018	0.0005	mg/L	≤400	<0.0005
2,4,6-Trichlorophenol	USEPA 8270E-2018	0.0005	mg/L	≤2	<0.0005
³⁾ Methylphenol	USEPA 8270E-2018	0.001	mg/L	≤200	<0.001
2-Methylphenol	USEPA 8270E-2018	0.0005	mg/L	≤200	<0.0005
3&4-Methylphenol	USEPA 8270E-2018	0.0005	mg/L	≤200	<0.0005
Endrin	USEPA 8270E-2018	0.0005	mg/L	≤0.02	<0.0005
γ-BHC	USEPA 8270E-2018	0.0005	mg/L	≤0.4	<0.0005
Toxaphene	USEPA 8270E-2018	0.050	mg/L	≤0.5	<0.050
Methoxychlor	USEPA 8270E-2018	0.0005	mg/L	≤10	<0.0005
Heptachlor	USEPA 8270E-2018	0.0005	mg/L	≤0.008	<0.0005
γ-Chlordane	USEPA 8270E-2018	0.0005	mg/L	-	<0.0005
α-Chlordane	USEPA 8270E-2018	0.0005	mg/L	-	<0.0005
⁴⁾ Chlordane(Total)	USEPA 8270E-2018	0.001	mg/L	≤0.03	<0.001

Remark:

- 1).Preparative method:USEPA1311-1992(Toxicity Characteristic Leaching Procedure)
- 2).The Limits comes from CFR(code of federal regulations) title 40 part 261.24.
- 3):Methylphenol are the sum of 2-Methylphenol and 3&4-Methylphenol.
- 4):Chlordane(Total) are the sum of α- chlordane and γ- chlordane.



Method List

USEPA 200.8-1994 Metals ICP-MS
 USEPA 7473-2007 Metals-Hg
 USEPA 8151A-1996 Acid Herbicides in Water by GC-MS
 USEPA 8260D-2018 VOCs
 USEPA 8270E-2018 SVOCs

Equipment Information

Method:USEPA 200.8-1994

Equipment Name	Model	Equipment Number	Serial Number
ICP-MS	Agilent 7900	CHEM-998	JP16311502

Method:USEPA 7473-2007

Equipment Name	Model	Equipment Number	Serial Number
Hg analyzer	Milestone DMA-80	CHEM-958	16041979

Method:USEPA 8151A-1996

Equipment Name	Model	Equipment Number	Serial Number
GC-MS	Agilent 7890A/5975C	CHEM-ENV085	CN12371032/US12362A17

Method:USEPA 8260D-2018

Equipment Name	Model	Equipment Number	Serial Number
PT-GC-MS	Agilent AQUATEk100/7890B/5977A	CHEM-937	US15240014/CN15423234/US1541L452

Method:USEPA 8270E-2018

Equipment Name	Model	Equipment Number	Serial Number
GC-MS	Agilent 7890B/5977A	CHEM-1118	CN18053182/US1805M023



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APPENDIX 1

Report No.:SHE21-12394 R1

Customer Reference: -



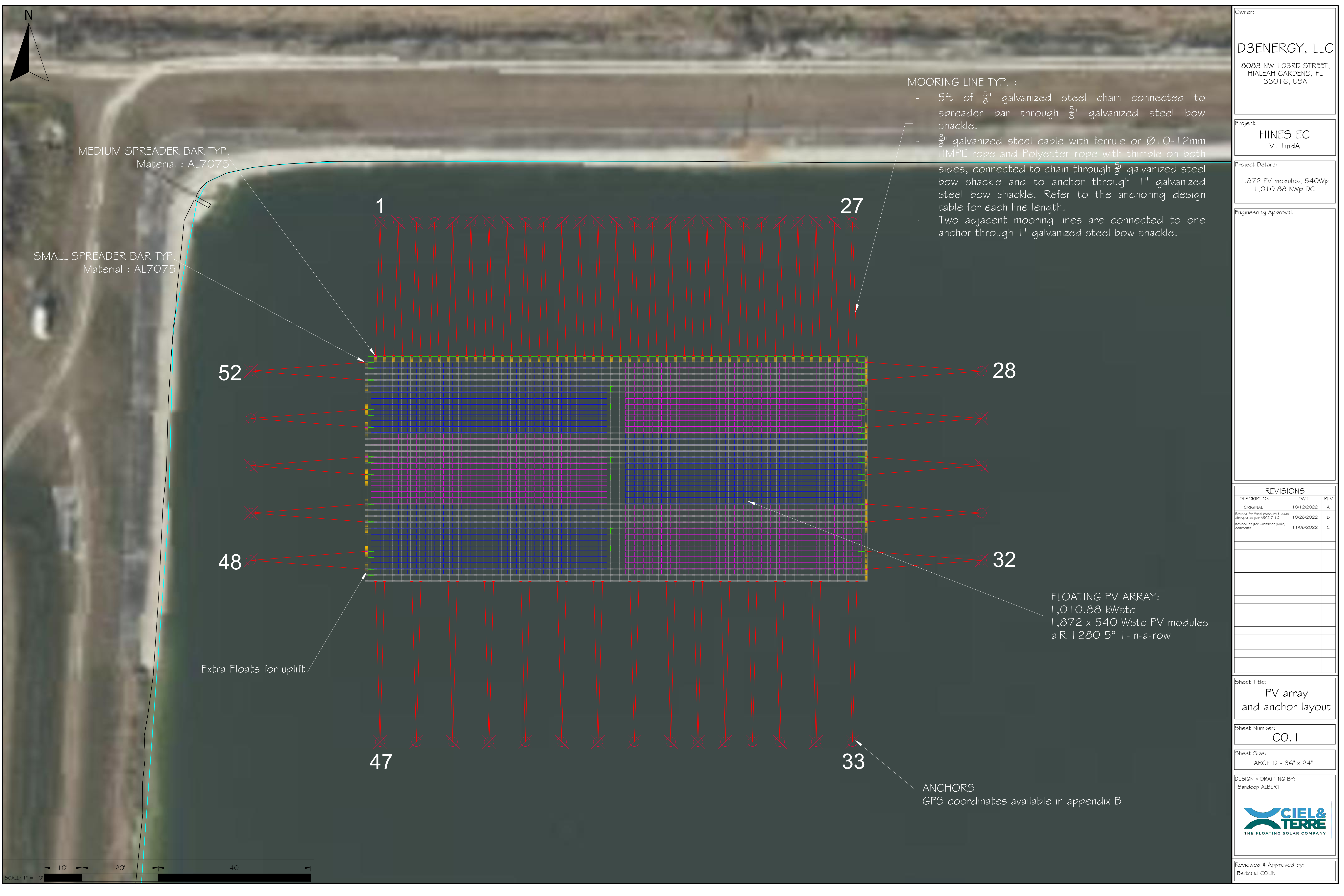
APPENDIX 2

Report No.:SHE21-12394 R1

Customer Reference: -



End of report



D3ENERGY, LLC

Project:

Project Details:

Engineering Approval:

[illegible]

Sheet Title:

Sheet Number:

Sheet Size:

ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
Sandeep ALBERT



This technical cross-section diagram illustrates a roof waterproofing system. The structure consists of a sloped roof deck, a concrete base, and a multi-layered waterproofing assembly. The waterproofing layers are labeled with numbers 1 through 8, indicating the sequence of construction from the base to the final surface. The diagram also shows the integration of a drainage system, including a drain pipe and a protective structure, and the placement of insulation and a final protective layer.

The diagram includes the following numbered callouts:

- #1: Points to the concrete base layer.
- #2: Points to the first waterproofing layer.
- #3: Points to the second waterproofing layer.
- #4: Points to the third waterproofing layer.
- #5: Points to the fourth waterproofing layer.
- #6: Points to the fifth waterproofing layer.
- #7: Points to the sixth waterproofing layer.
- #8: Points to the seventh waterproofing layer.

NOTE:

- The distance between the floating array to the anchor point and so the steel cables lengths vary for each anchor point. The details per anchor is reported in the WUS170_V11IndA_ANC_Anchoring Design Report_Appendix B
- The drawings is not to scale and is for illustrative purposes only

Engineering Approval:

Reviewed & Approved by:
Bertrand COLIN

This diagram illustrates the exploded view of the solar module mounting system. The components are labeled as follows:

- NORTH BEAM**: The main horizontal mounting rail.
- NUT**: A small black plastic nut used for the North Beam.
- LEG**: The vertical mounting bracket that connects the North Beam to the roof structure.
- RIVET**: A metal rivet used to secure the leg to the North Beam.
- M8 SCREW**: A screw used to secure the leg to the roof structure.
- Z WASHER**: A Z-shaped washer used between the leg and the roof structure.
- WASHER**: A standard flat washer used between the leg and the roof structure.
- SOLAR MODULE**: The solar panel being mounted.
- ALUMINIUM BRACE**: A horizontal brace that supports the North Beam.
- NUT**: A nut used to secure the aluminium brace.

Technical drawing of the solar panel assembly. The drawing shows a perspective view of the assembly. A horizontal beam, labeled "SOUTH BEAM", is mounted on a structure. A "SOLAR MODULE" is shown mounted on the beam. The assembly is secured with "RIVETS". A "NUT" is shown on the left side of the beam. A "WASHER" is shown on the left side of the beam. A "Z WASHER" is shown on the left side of the beam. An "M8 SCREW" is shown on the left side of the beam. The drawing is a technical illustration of the assembly.

Diagram illustrating the assembly of a spreader bar with a shackle and connection nut. The components are labeled:

- CONNECTION PIN
- CONNECTION NUT
- SPREADER BAR
- SHACKLE

Exploded view diagram of a float assembly. The diagram shows the following components and their assembly relationships:

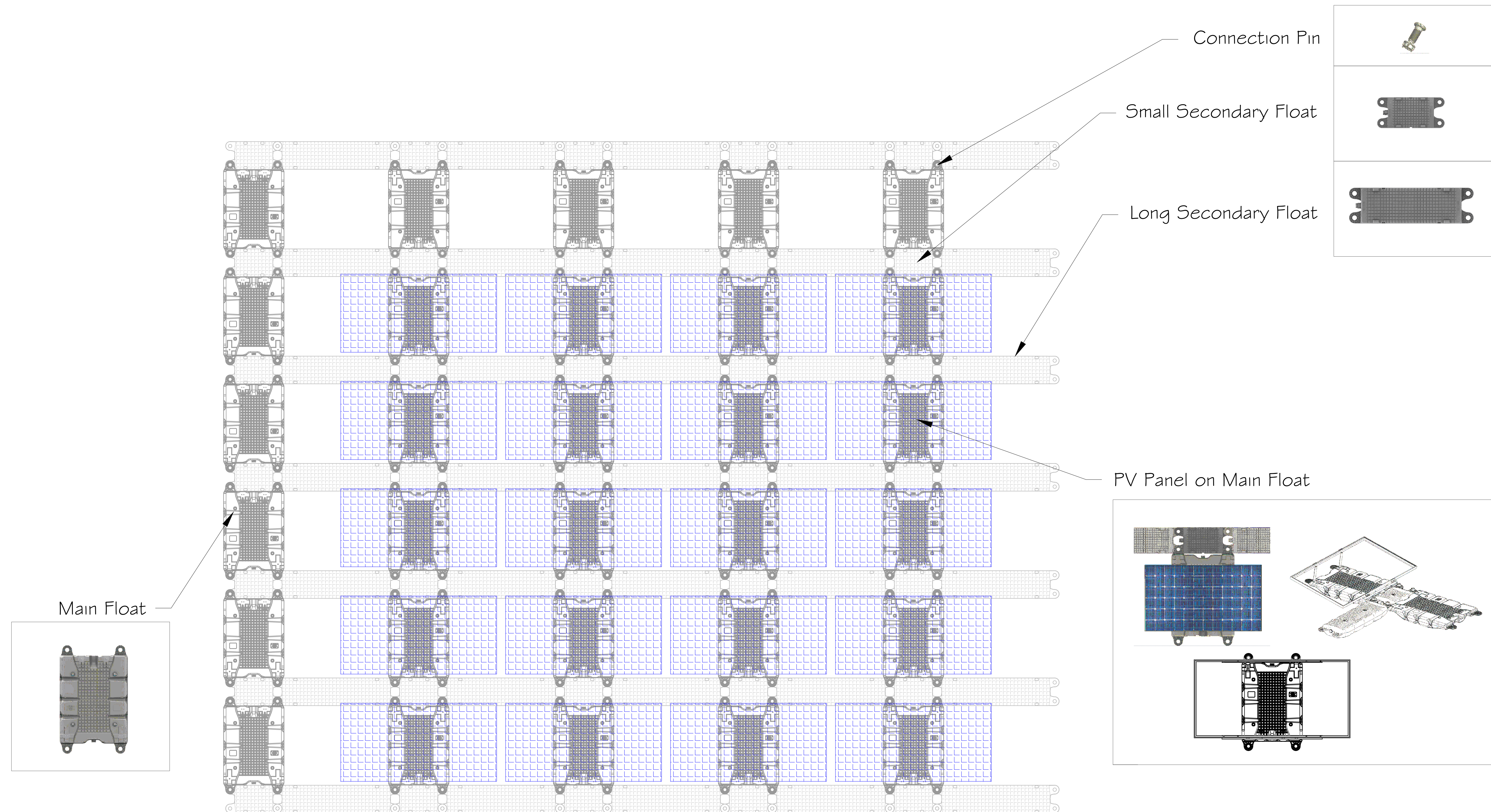
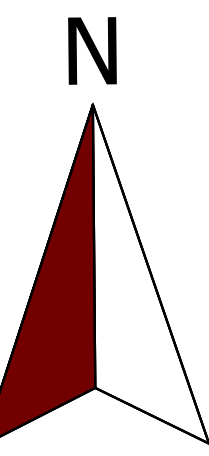
- MAIN FLOAT**: The primary float component.
- SMALL SECONDARY FLOAT**: A secondary float component that fits into the main float.
- CONNECTION NUT**: A nut that secures the float assembly to the main structure.
- SELF DRILLING SCREW**: A screw used to secure the float assembly.
- LONG SECONDARY FLOAT**: A secondary float component that fits into the main float.
- CONNECTION PIN**: A pin used to secure the float assembly.

SOLAR MODULE

LONG SECONDARY FLOAT

MAIN FLOAT

Reviewed & Approved by:
Bertrand COLIN



NOTE: This is a reference illustration to provide an overview of the assembly of the various array components, module sizing is arbitrary.

Owner:

D3ENERGY, LLC

8083 NW 103RD STREET,
HIALEAH GARDENS, FL
33016, USA

Project:

HINES EC
VII IndA

Project Details:

1,872 PV modules, 540Wp
1,010.88 KWp DC

Engineering Approval:

[illegible]

Sheet Title:

Array details

Sheet Number:

CO.4

Sheet Size:

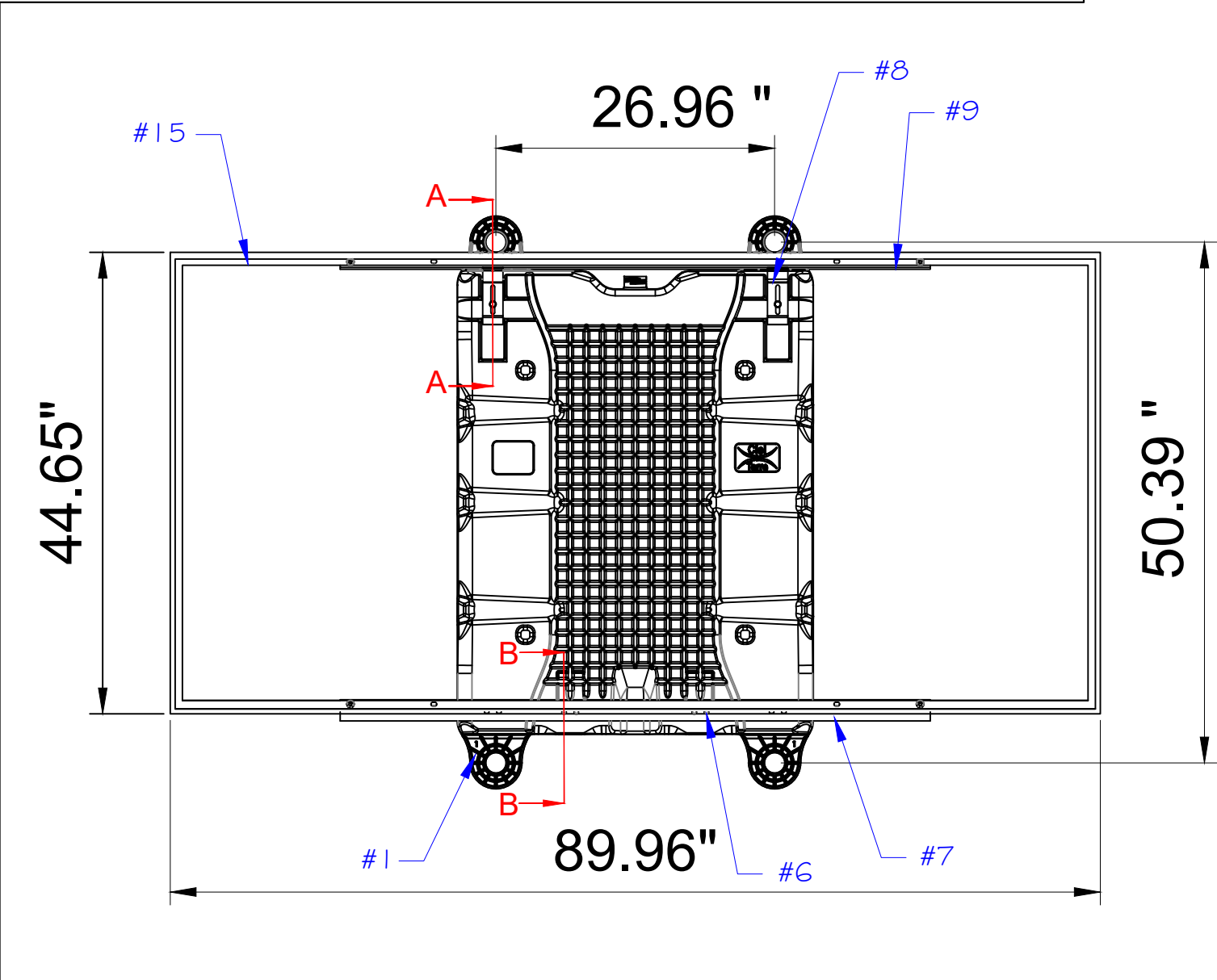
ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
Sandeep ALBERT



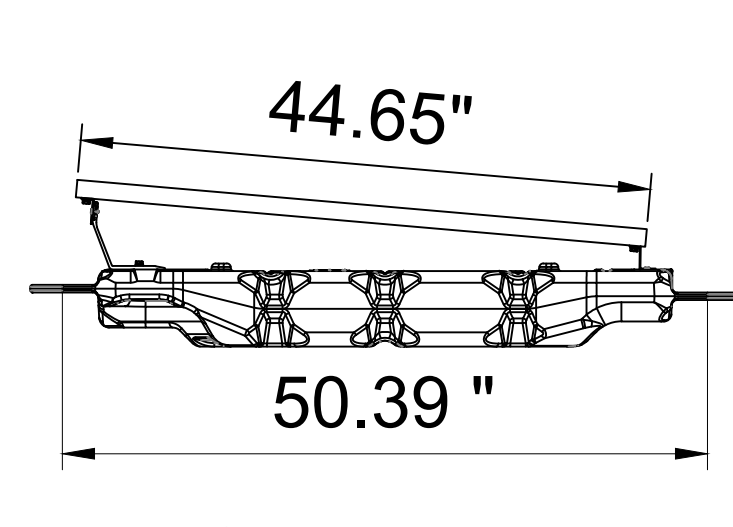
Reviewed & Approved by:
Bertrand COLIN

PV MODULE FIXING SYSTEM



REFER TO USER MANUAL FOR
INSTALLATION PROCEDURE AND NOTES.

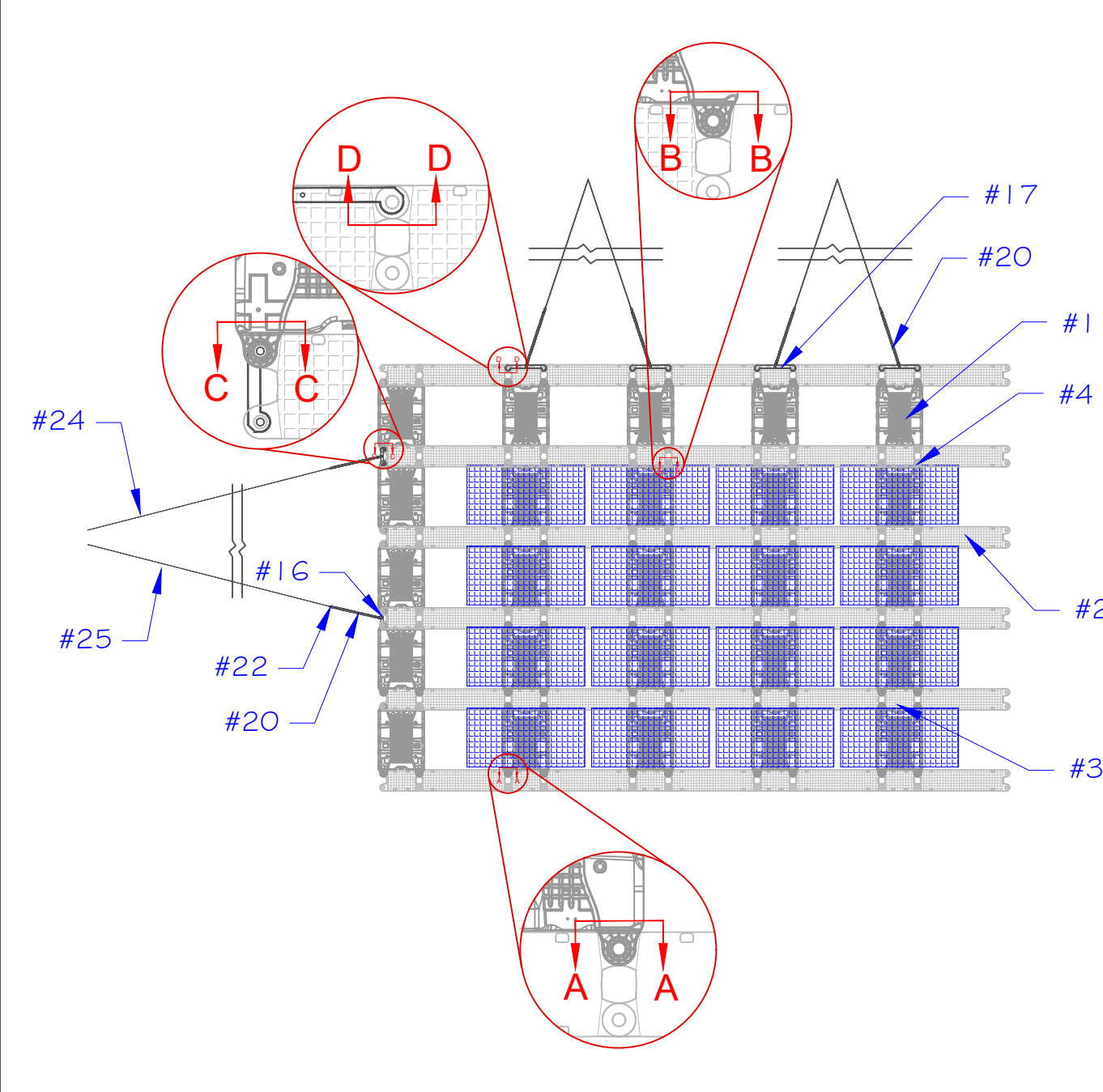
DIMENSION MENTIONED ARE IN INCHES.



SIDE VIEW

SCALE: 1" = 15'

ARRAY ASSEMBLY

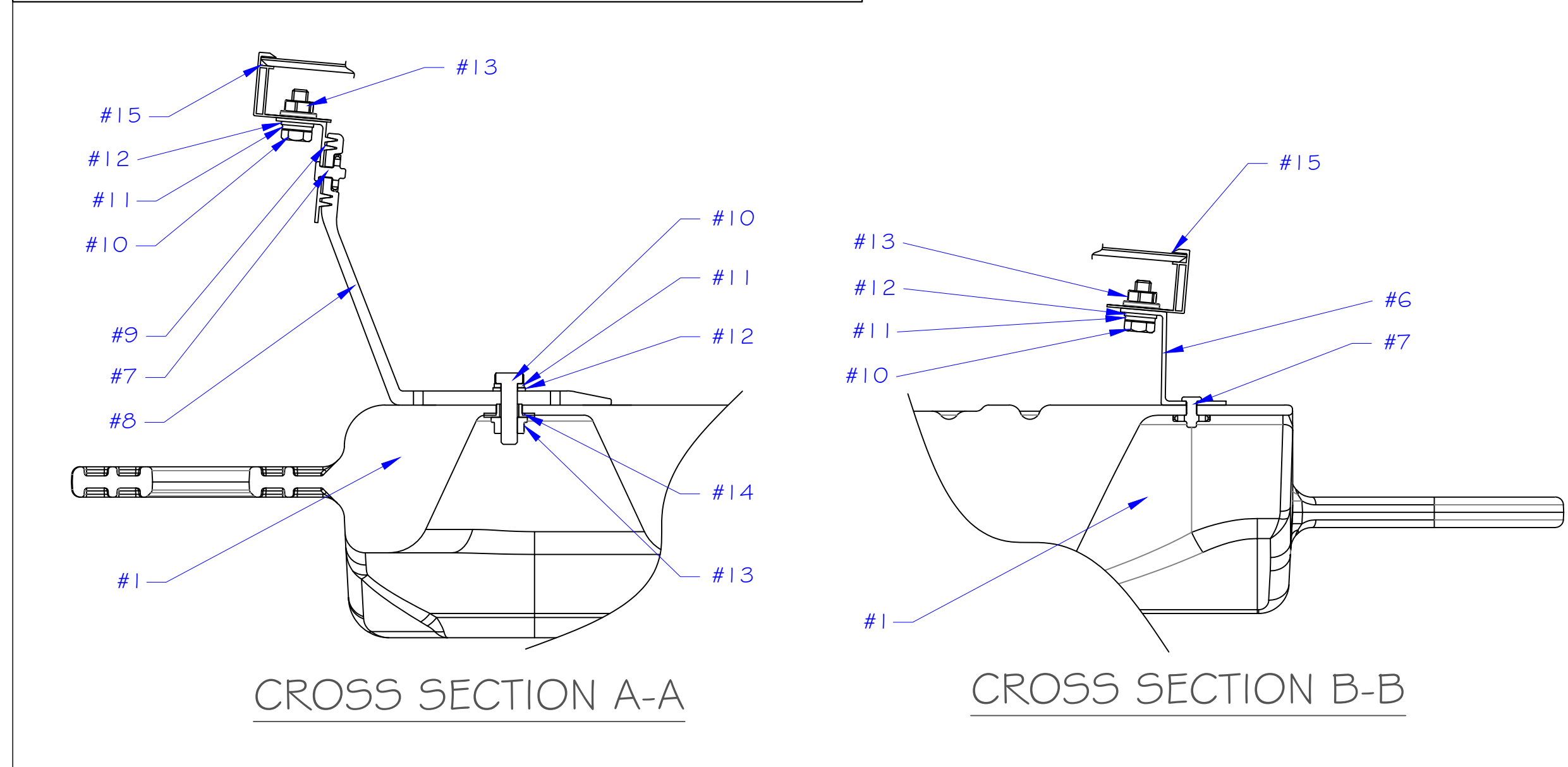


NOTES:

1. REFER TO ARRAY LAYOUT FOR DETAILED FLOATS, SPREADER BARS AND ANCHORS ARRANGEMENT.
2. REFER TO USER MANUAL FOR INSTALLATION PROCEDURE AND NOTES.
3. BE CAREFUL TO THE POSITION WHILE SUPERIMPOSING THE FLOAT'S TABS.
4. DO NOT DAMAGE THE NUT WHEN FASTENING THE Cotter PIN.
5. LOCK THE CONNECTION PIN WITH A Cotter PIN AFTER THE SPREADER BAR INSTALLATION.

PLEASE NOTE: The above drawing is not to scale and is for illustrative purposes only

PV MODULE FIXING SYSTEM - DETAIL

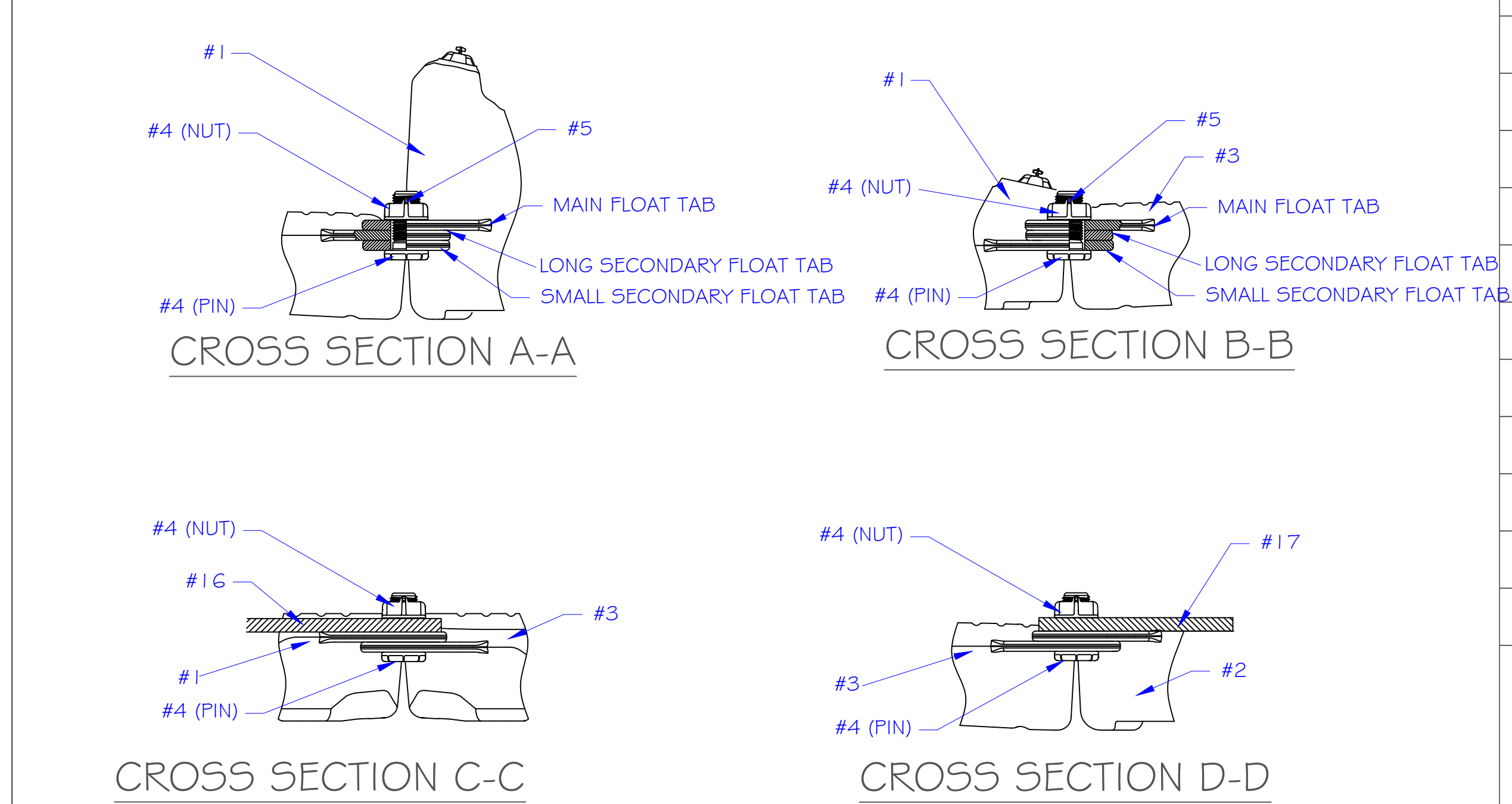


CROSS SECTION A-A

CROSS SECTION B-B

PLEASE NOTE: The above drawing is not to scale and is for illustrative purposes only

ARRAY ASSEMBLY - CROSS SECTIONS



CROSS SECTION C-C

CROSS SECTION D-D

PLEASE NOTE: The above drawing is not to scale and is for illustrative purposes only

BILL OF MATERIALS :	Owner:
---------------------	--------

ITEMS	DESCRIPTION	QTY	MATERIAL
#1	MAIN FLOAT (includes floats for uplift)	2,237	HDPE
#2	LONG SECONDARY FLOAT (includes floats for uplift)	2,233	HDPE
#3	SMALL SECONDARY FLOAT (includes floats for uplift)	2,192	HDPE
#4	CONNECTION PIN (SCREW + NUT)	8,732	HDPE
#5	COTTER PIN	8,732	PP 40% GF
#6	SOUTH BEAM	1,872	AL6063
#7	ALUMINUM TRI-FORM RIVETS	11,232	AL6063
#8	LEG	3,744	AL6063
#9	NORTH BEAM	1,872	AL6063
#10	SCREW M8	11,232	SUS 304
#11	Z WASHER	11,232	SUS 304
#12	FLAT WASHER	11,232	SUS 304
#13	FLANGE NUT WITH TEETH	11,232	SUS 304
#14	ALUMINIUM BRACE	3,744	AL6063
#15	PV MODULE	1,872	SEE PROVIDED DATA SHEET
#16	SPREADER BAR aR (SMALL)	20	AL7075 - ANODIZED
#17	SPREADER BAR aR (MEDIUM)	84	AL7075 - ANODIZED
#18	-NA-		
#19	-NA-		
#20	CHAIN DIAM = 5" Length = 5'	104	GALVANIZED STEEL
#21	MOORING CABLE Length= Varies	104 7,033'	GALVANIZED STEEL / FIBRE
#22	SMALL SHACKLE	312	GALVANIZED STEEL
#23	LARGE SHACKLE	52	GALVANIZED STEEL
#24	POLYESTER ROPE Length = Varies	104 5,200'	POLYESTER
#25	MAINTENANCE CABLE Length = Varies	104 5,850'	GALVANIZED STEEL / FIBRE

*Quantity of spares are excluded.

Owner:

D3ENERGY, LLC
8083 NW 103RD STREET,
HIALEAH GARDENS, FL
33016, USA

8083 NW 103RD STREET,
HIALEAH GARDENS, FL
33016, USA

Project: LUNEC EG

HINES EC
VI IndA

Project Details:

1,872 PV modules, 540Wp
1,010.88 KWp DC

Engineering Approval:

[illegible]

Sheet Title:
Hydraulic system

Hydride system details

Sheet Number: 605

CO.3
Sheet Size:

ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
Sandeep ALBERT

[illegible]

Reviewed & Approved by:
Boekend COLIN

Der traua COLIN



Dia, : 18mm (0.71 in)



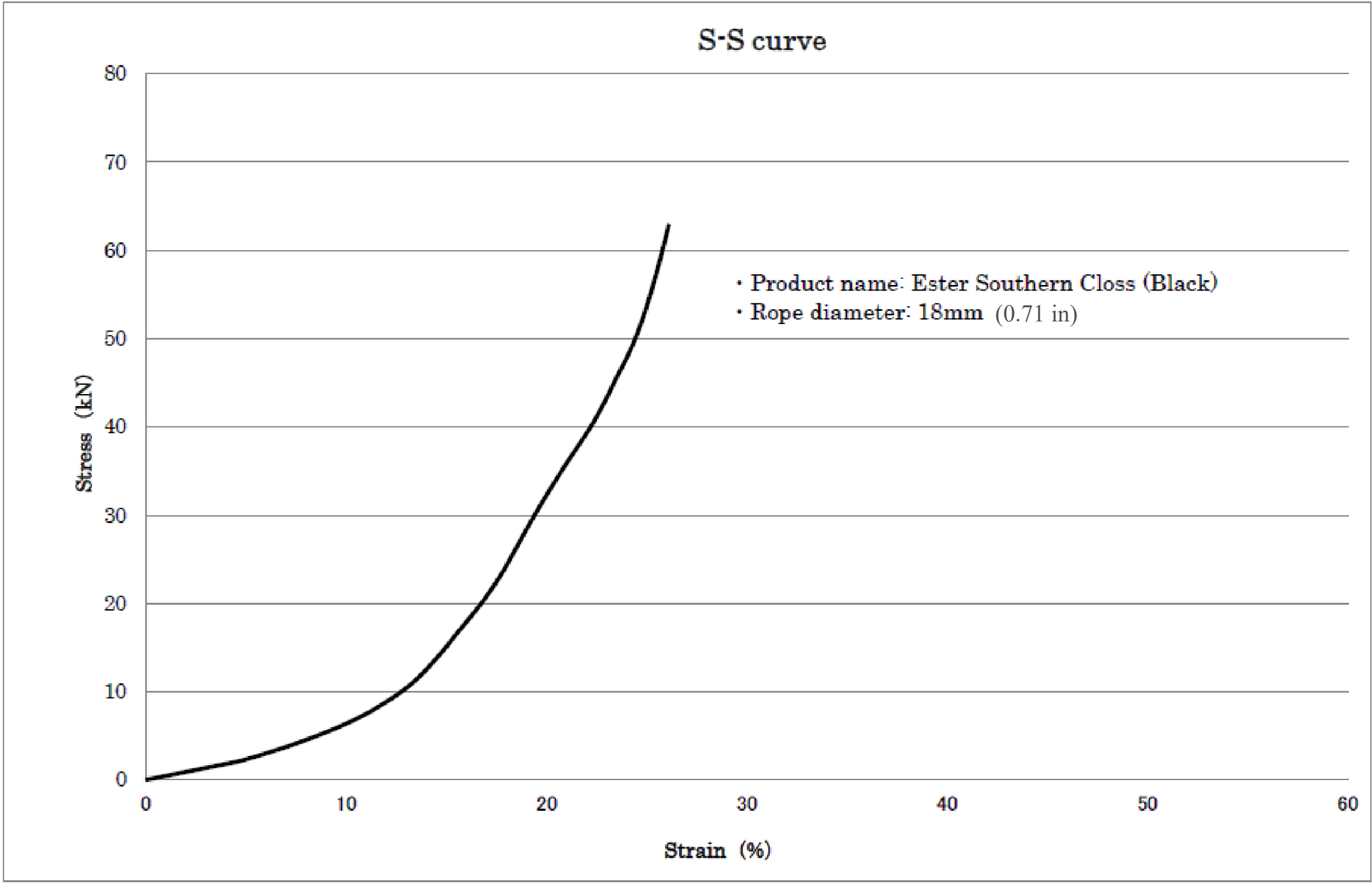
Side

cross section

M.B.S : 63.7kN (14,320.40 lbs)

Mass : 52.1kg/200m (114.9lbs/656 ft)

Terminal processing : Both eye splices (using stainless course A-22)
Serving under the neck



<i>Rope type:</i>	MegaTwin Dyneema® MAX SC 12 mm Ø solid black
<i>Raw material:</i>	Core: Dyneema® DM20 Cover: Polyester
<i>Rope standard:</i>	Manufactured according to factory standard
<i>Break load linear [kN]</i>	71,94
<i>Break load spliced [kN]</i>	64,75
<i>weigh [kg/100 m]</i>	9,90



3 / 8 X 1000 FT, 7X19 Galvanized Aircraft Cable

- 3/8" Galvanized Aircraft Cable
- Extra Flexible 7 x 19 Construction
- Commercial Grade
- Min. Breaking Strength: 14,400 lbs
- Not suitable for Aircraft Controls
- 1,000 ft/reel
- Weight 243 lbs/mft

5 / 8 X 150 FT Galvanized Proof Coil Chain

Product Code:12H625-0150

Working Load Limit 6,900 lbs



**1" Commercial Grade Screw Pin Anchor Shackle, WLL 5-1
/ 2 Ton X 5 Pcs**

Product Code:CGSPA100X5C

- Working Load Limit: 5-1/2 tons
- Safety Factor 4:1
- Pin of 1045 Steel, Diameter = 1.125"
- Body of 1020 Steel
- Weight 4.9 lbs/ea



5 / 8 Commercial Grade Screw Pin Anchor Shackle, WLL
2-1 / 4 Ton X 25 Pcs

Product Code:CGSPA625X25C

- Working Load Limit: 2-1/4 tons
- Pin of 1045 Steel, Diameter - 3/4"
- Body of 1020 Steel
- Weight 1.39 lbs/ea



NOTE: For all the above mooring line materials, similar product can be used based on the same specification & availability and exact requirements are defined in the anchoring design report.

Owner:

D3ENERGY, LLC
8083 NW 103RD STREET,
HIALEAH GARDENS, FL
33016, USA

Project: HINES EC
VII IndA

Project Details:

1,872 PV modules, 540Wp
1,010.88 KWp DC

Engineering Approval:

[illegible]

Sheet Title:

Mooring Line
material details

Sheet Number: C0.6

Sheet Size:
ARCH D - 36" x 24"

DESIGN & DRAFTING BY:
Sandeep ALBERT



Reviewed & Approved by:
Bertrand COLIN

WUSTFJANC_Detailed anchoring design_QUASI STATIC				
Project name	HINES_EC	Date of update	Version	
Customer	DIENERGY, LLC	06/10/2022	V1004	
Type of project	FLOATING	Updated by	Revision	
Project capacity	1,010.88 kWp	SA/J	Rev.2	

Table creation

Mooring line's elasticity

All Stretchable

Type of anchoring system :
Concrete Blocks at the Bottom of the reservoir

Site data			
Highest water level above sea level	60.29 m	165.00 ft	
Lowest water level above sea level	44.02 m	151.00 ft	
Lowest ground bottom	42.00 m	137.80 ft	
Height of overflow above HWL	0.00 m	0.00 ft	
Maximum Water Level considering overflow	60.29 m	165.00 ft	
Maximum water level variation	4.27 m	14.00 ft	

Data for concrete blocks	
Friction factor	0.80
Concrete density	2,400 kg/m³
Water density	1,000 kg/m³

Data on ears and spreader bars			
Spreader bar safe working load		11.98 kN	2,692.34 lbs
		1.99 kN	1,344.75 lbs
Connection pin reference load			
Data on chains			
Total chain length		1.60 m	4.92 ft
Preinstalled chain length		0.90 m	1.44 ft
Extra chain length		1.00 m	3.28 ft

Max wind speed (at 0.5 m)	
49.37 m/s	110.43 mph
Max dynamic pressure (at 0.5 m)	
1,493.85 Pa	31.20 psf

Anchor ref		Anchor side	Anchoring type	SB side	Unique ID or shared ID?	Mooring line's elasticity	Coordinates related to projected coordinates system NAD83 Florida State Planes, East Zone, meters			Level difference	D		Spreader bar pitch (internal pitch)		Spreader bar pitch (external pitch)		Alpha	Beta	Details per anchoring point												Mooring line																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
							X				Y	Z	H	m	ft	m			ft	m	ft	Design load on anchoring point		Horizontal loads in anchoring point		Vertical loads in anchoring point		Slope	Needed effective weight	Length (m)	Height (max)	Concrete block volume	Concrete block mass	Concrete block mass	Number of blocks (3750 lbs)	Load in mooring line		Total chain length	Needed cable/rope length		HMPE length		Cable/HMPE length to order		Polyester length		Polyester length to order		Maintenance Cable length to order		Mooring line length																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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