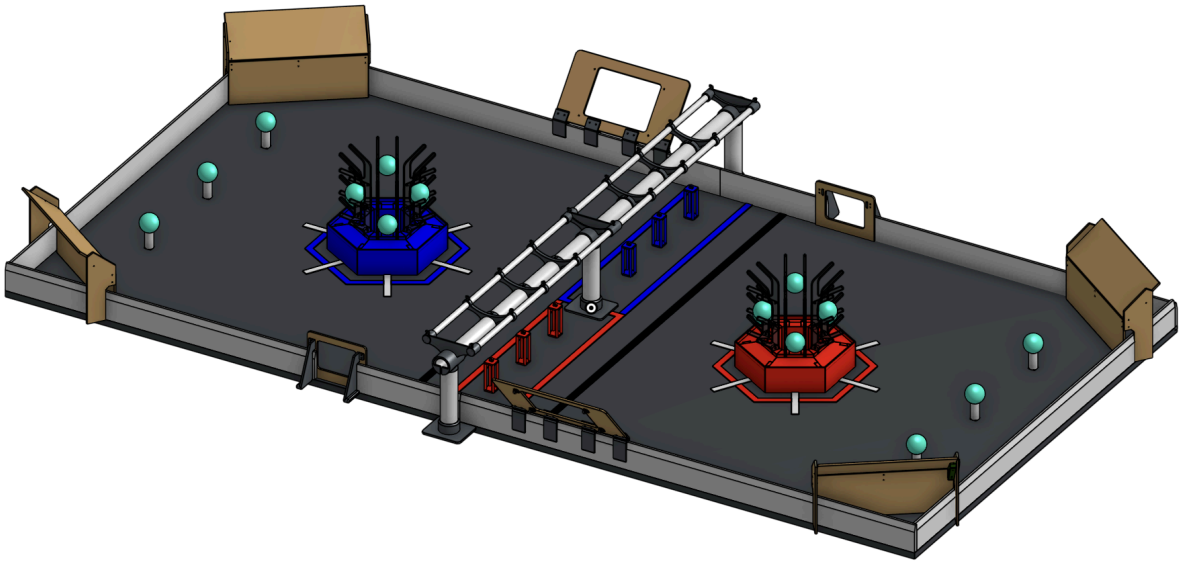
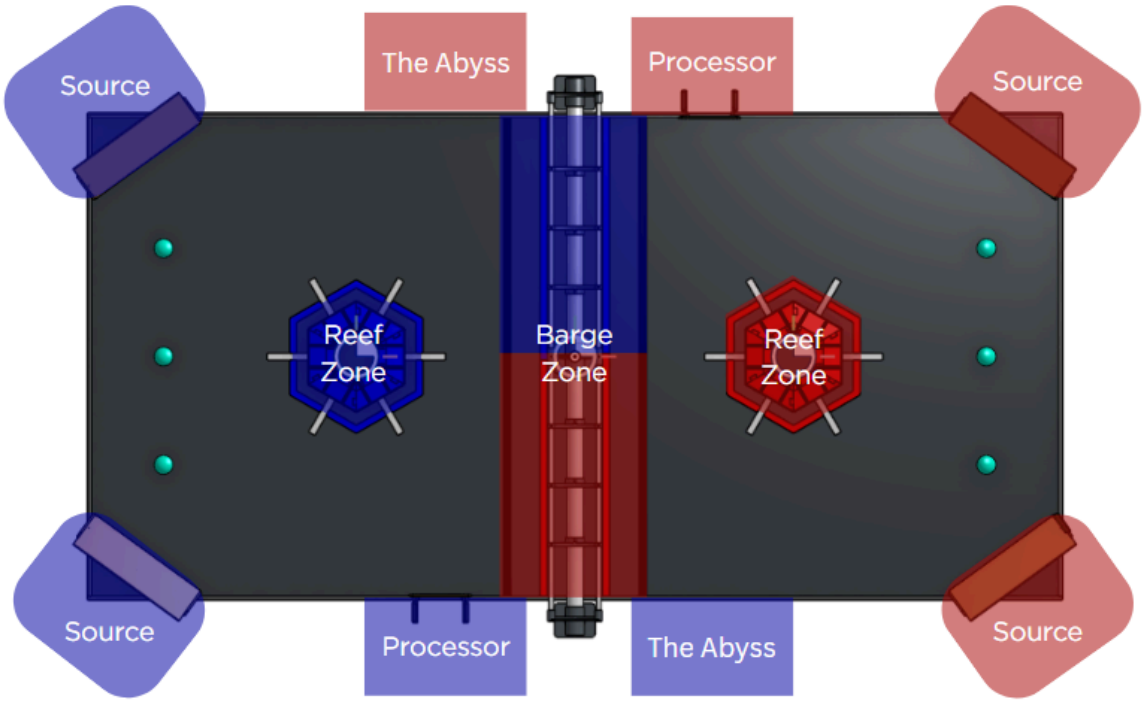
PRESENTED BY HAAS Gene Haas Foundation

In this game, alliances score points by scoring coral on the reef, placing algae in the barge, placing algae in the processor, and climbing a cage.

Refer to the FRC Reefscape manual for any rules not mentioned here.



# 1 Field Overview




The Reefscape field consists of two types of zones.

1.1.1) Reef Zone

- An infinitely tall, 6-sided, ~19.6-inch wide (face to face) volume surrounding the ALLIANCE REEF. It is bounded by and includes the ALLIANCE-colored tape

1.1.2) Barge Zone

- a ~10.22 inch deep by ~35.9 inch wide, infinitely tall, 4-sided volume surrounding the ALLIANCE's half of the BARGE. It is bounded by and includes the ALLIANCE colored tape

The Reefscape field contains four Scoring Elements.

1.2.1) Reef

- The REEF is one of the four scoring locations on the field
- The REEF comprises 12 polycarbonate branches extending from the base. There are 4 scoring locations on the reef

- The trough (L1) is the lowest of the CORAL scoring opportunities, located on top of the base of the REEF
- L2, L3, and L4 each stem from the REEF branches, and are tilted up at 35 degrees from the carpet
- Compared to circles in the FRC version of REEFSCAPE, the MiniFRC branches are rectangular, measuring .5 inches by .25 inches.
- CORAL placed on higher branches earns more points, **but is invalid if it is touching an ALGAE**
    - If the ALGAE is resting on the L2 branch, scoring coral on L2 and L3 is invalid
    - If the ALGAE is resting on the L3 branch, scoring on L3 ONLY is invalid
- At the start of a match, ALGAE is placed in between either L2 and L3, or L3 and L4

1.2.2) Processor

- The PROCESSOR is the low ALGAE scoring location, with one located in each ALLIANCE area
- The PROCESSOR is integrated into the guardrail near the ALLIANCE'S REEF ZONE and adjacent to the opponent's PROCESSOR AREA
- Each PROCESSOR has a rectangular opening through which ROBOTS score ALGAE

1.2.3) Barge

- **Only robots may score in the BARGE**
- The BARGE is the high ALGAE scoring location, with each ALLIANCE having a BARGE net in the middle of the field
- Robots can score Barge by placing ALGAE into their ALLIANCE's Barge net

1.2.4) Cages

- Six 3d-printed cages are hung from the barge by string
- **MiniFRC Reefscape has no shallow climb option! Only deep climb**
- **A ROBOT touching the barge and/or chain is a valid climb, however if the barge or chain is bearing any weight of the robot it is invalid**
- Cages are 1.5 x 1.5 x 4.5 inches

1.2.5) Abyss

- **<u>Only the human player can score in the ABYSS</u>**
- The ABYSS is the human player ALGAE scoring location, with each ALLIANCE's human player having an ABYSS installed on the wall across from the PROCESSOR.
- The human player of an ALLIANCE scores into the ABYSS across from the PROCESSOR AREA of the opposite ALLIANCE
- The ABYSS is made of an MDF backboard attached to the field wall and a net behind the backboard's opening.
- The human player can score in the ABYSS by tossing an ALGAE from their ALLIANCE'S PROCESSOR into the net of the ABYSS across from them.
- If the human player misses the ABYSS net, and the ALGAE falls back into the field, the ALGAE returns to play.
- If the human player misses the ABYSS net, and the ALGAE goes outside the field, the ALGAE is returned to play at the location it left the field.

1.3) Auto Align Markings

- Extending from each side of an ALLIANCE'S REEF is a 6x1" strip of white, reflective tape.
- Robots may use color/line detectors on these markings to align with the reef.

1.4) Coral

- CORAL is a non-compliant tube made of PLA.
- CORAL can be scored on all four levels of the REEF, and are introduced to the field via the LOADING STATION.
- Robots may be preloaded with one coral at the start of each match, and there are 3 upright CORAL in each ALLIANCE zone.
- CORAL placed on higher branches earns more points, **<u>but is invalid if it is touching an ALGAE</u>**
    - If the ALGAE is resting on the L2 branch, scoring coral on L2 and L3 is invalid
    - If the ALGAE is resting on the L3 branch, scoring on L3 ONLY is invalid

1.5) Algae

- ALGAE is a 2.68 inch foam sphere (stress ball).
- ALGAE can be scored in either the PROCESSOR or the BARGE.
- All ALGAE begin the match on the field, with 6 on each ALLIANCE REEF, and one on each upright CORAL.

1.6) Loading Station

- There are 4 total loading stations, one in each corner of the field. CORAL can be introduced either directly into a robot through the LOADING STATION or dropped onto the ground
- Human players at each LOADING STATION must not contact a CORAL at the same time as a robot, and a CORAL has to contact the LOADING STATION and the LOADING LINE (a black line on each LOADING STATION 3” from the top of the STATION) before being released into the field.
- The LOADING STATION is <u>not</u> a protected zone, which means that defense can be played at LOADING STATIONS

# 2 Match Play

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2.1) Match Setup

- During match setup, teams put their robots in their starting positions and preload a Coral if desired.
- ***<u>Please make sure to avoid stepping on the field elements while putting robots onto the field</u>***
    - If the field elements are stepped on and are damaged, the competition may not be able to continue!
- Starting positions
    - Robots begin the match with all mechanisms within their frame perimeter and must be on the starting line.

2.2) Autonomous period

- Each match begins with a 15-second autonomous period.
- A sound will play to signal that the autonomous period has started.

- At the start of the autonomous period, each driver may briefly press one button or key to signal to their robot that the autonomous has started.
    - Teams may choose to have different buttons for running different autonomous periods.
- Drivers may not control their robots until the start of the teleoperated period.

2.4) Teleoperated period

- Once the autonomous period ends, the 135-second (2 min 15 sec) teleoperated period begins.
- A sound will play to signal that autonomous has ended and the teleoperated period has begun.
- Once 20 seconds are left in the teleoperated period, a sound will play to signal that the endgame period has begun.
- During the endgame period, robots may climb a cage or park
    - **A ROBOT may touch the chain or barge when climbing, but the chain or barge should not be bearing any of the robot's weight**
- A sound will play to signal that the teleoperated period has ended.

# 3 Point Values

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3.1) During teleoperated period

- Score CORAL in trough (L1) - 2
- Score CORAL on L2 BRANCH - 3
- Score CORAL on L3 BRANCH - 4
- Score CORAL on L4 BRANCH - 5
- Score ALGAE in PROCESSOR - 4
- Score ALGAE in BARGE - 5
- Score ALGAE in ABYSS - 3

3.2) During Autonomous period

- LEAVE - 3
- Score CORAL in trough (L1) - 3
- Score CORAL on L2 BRANCH - 4
- Score CORAL on L3 BRANCH - 6
- Score CORAL on L4 BRANCH - 7
- Score ALGAE in PROCESSOR - 4

- Score ALGAE in BARGE - 5

3.3) Endgame tasks

- PARK in the BARGE ZONE - 2
- Off-the-ground via deep CAGE - 8

3.4) Ranking Points (RP)

- Coopertition Bonus (only used to reduce Coral RP requirement)
  - At least 2 ALGAE scored in each PROCESSOR
- Auto RP - 1
  - 3 ROBOTS LEAVE and at least 1 CORAL scored in AUTO
- CORAL RP - 1
  - At least 3 CORAL scored on each level or
  - If Coopertition achieved, at least 3 CORAL must be scored on 3 levels
- BARGE RP - 1
  - At least 10 BARGE points are scored
- WIN - 3
  - Completing a MATCH with more MATCH points than your opponent
- TIE - 1
  - Completing a MATCH with the same number of MATCH points as your opponent

3.5) Win-loss-tie

- An alliance wins a match by scoring more points than the opposing alliance
- If an alliance wins a match, they earn (3) additional ranking points.
- If an alliance loses a match, they earn (0) additional ranking points.
- If the alliances tie, then they each earn (1) additional ranking point.
- There are no tiebreakers for playoffs. If there is a tie, the match is replayed.

# 4 Competition Flow

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The competition will consist of two rounds, qualifications and playoffs.

4.1) Qualifications

- During the qualification round, teams will compete in matches to earn ranking points.

- At the end of the qualification round, teams are ranked by the number of ranking points they have.
- If there is a tie in ranking points, the tiebreakers are as follows:
    - Average ALLIANCE Barge points (Deep Climb)
    - Average ALLIANCE Auto Points
    - Random Sorting by FMS

4.2) Playoffs

- The top-ranked teams each pick 2 alliance partners for the playoff round in a style similar to FRC alliance selection.
    - The number of alliance captains will be determined based on the number of teams at the event and how delayed it is. Historically, there have been a minimum of four alliance captains.
- During playoffs, alliances compete against each other in a bracket-style tournament.

# 5 Fouls and Cards

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Failing to follow the rules will result in an associated penalty. Penalties range from small point bonuses for the enemy alliance to yellow and red cards. **For rules on penalties, see Sections 6 and 7 of the official FIRST Reefscape manual.** Some notable penalties are listed here.

- Minor fouls (2 points to the other alliance)
    - A ROBOT may not control more than 1 CORAL and 1 ALGAE at a time.
    - No more than 1 ROBOT may be on the opponent's side of the FIELD (for every 3 seconds there is a second or third ROBOT on the other side of the field, a MAJOR FOUL is assessed)
    - A ROBOT may not PIN an opponent's ROBOT for more than 3 seconds.
    - CORAL must touch the black line when it is released from the CORAL STATION.
- Major foul (6 points to the other alliance)
    - In both AUTO and TELEOP, a ROBOT may not contact an opposing ALLIANCE's CAGE

    - A ROBOT may not touch an opponent ROBOT in their BARGE or REEF ZONE
    - A ROBOT may not put ALGAE or descore a CORAL on their opponent's REEF
    - A ROBOT may not tip or entangle with an opponent ROBOT.
    - A ROBOT may not contact an opponent ROBOT touching their CAGE during the last 20 seconds
    - HUMAN PLAYERS may not store more than 4 ALGAE in the PROCESSOR AREA
    - HUMAN PLAYERS may not intentionally score ALGAE in the BARGE
    - A ROBOT may not intentionally score ALGAE in the ABYSS
- Yellow card (2 yellow cards = red card)
    - Drivers may not control their robots outside of the teleoperated period
    - A ROBOT may not damage FIELD elements
    - A ROBOT may not put ALGAE on their opponent's REEF
    - A ROBOT may not deliberately, attach to, tip, or entangle with an opponent ROBOT
- Red card (Disqualification from the match)
    - Excessive ungracious or unprofessional behavior will result in a yellow or red card.

# 6 Robot Construction Rules

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6.1) Each robot must follow these rules in order to pass inspection and compete.

- A robot can have a maximum 32" Frame Perimeter.
    - Your frame perimeter includes your drive wheels, intake wheels, and any robot elements in their start of match configuration.
- A robot can weigh no more than 1.5 kilograms, batteries are included in the weight limit.
- The maximum starting height of robots may not be more than 9 inches.
- After the match begins, a robot can extend up to 4 inches horizontally beyond its frame perimeter, and there is no height limit
- A robot cannot intentionally circumvent the spirit of the robot size restrictions
- Bumpers are not required.
- Robots must prominently display their **color** and **number** during matches.

    - Robot color is commonly displayed using red and blue electrical tape, or a flag.
    - In addition to the robot labeling requirements, teams are required to display their name and number clearly on their driver station.

6.2) Robot Batteries

- Your robot battery may be one of the following:
    - One Li-ion 9V battery
    - Six NiCd AA batteries in series
    - Up to two NiCd 9V batteries in parallel
- Examples of legal Li-ion batteries:
    - Alfredo
    - Poover
- Your electrical system's maximum voltage must not exceed 9V (no boost converters or the like)
- Secondary batteries are allowed for coprocessors if they do not provide power for the robot's actuators and follow the spirit of the battery rules. Secondary batteries must be safe. Phone power banks are recommended; hobby LiPo batteries are not allowed.

# 7 Field Dimensions

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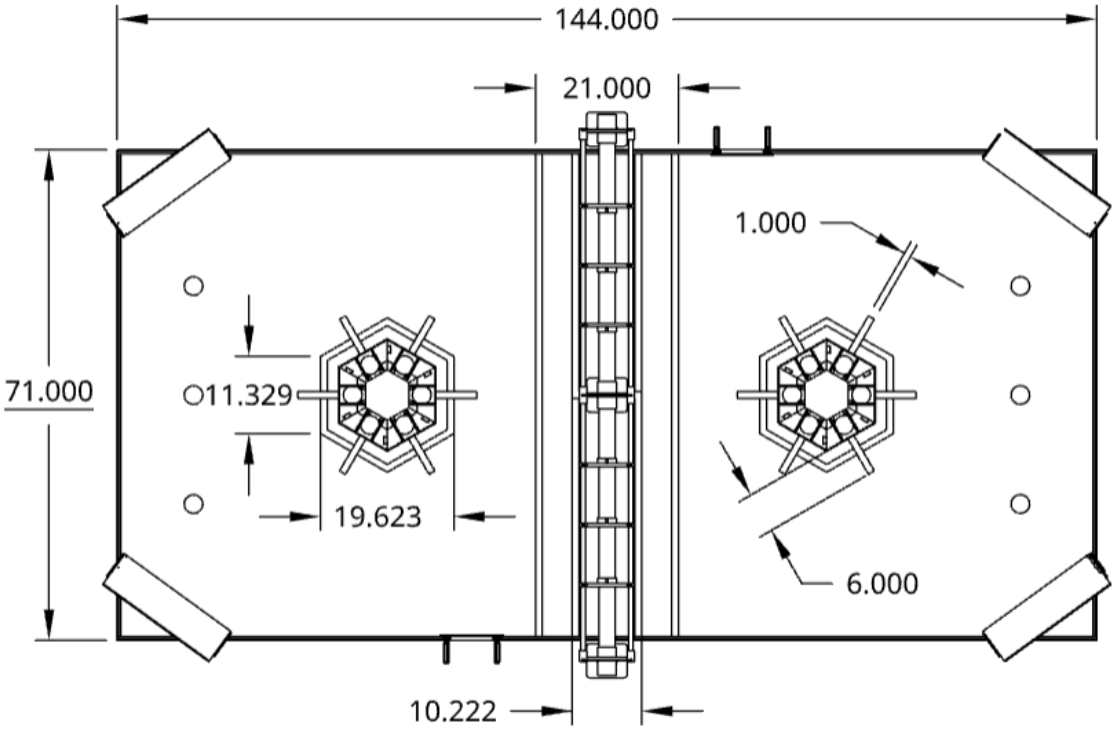
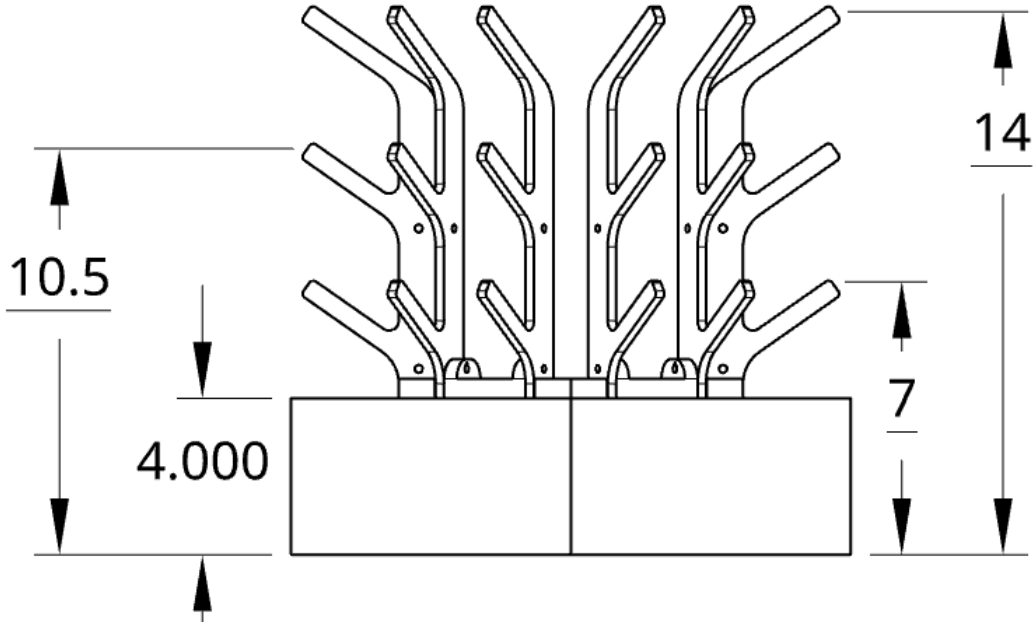
# Full Field

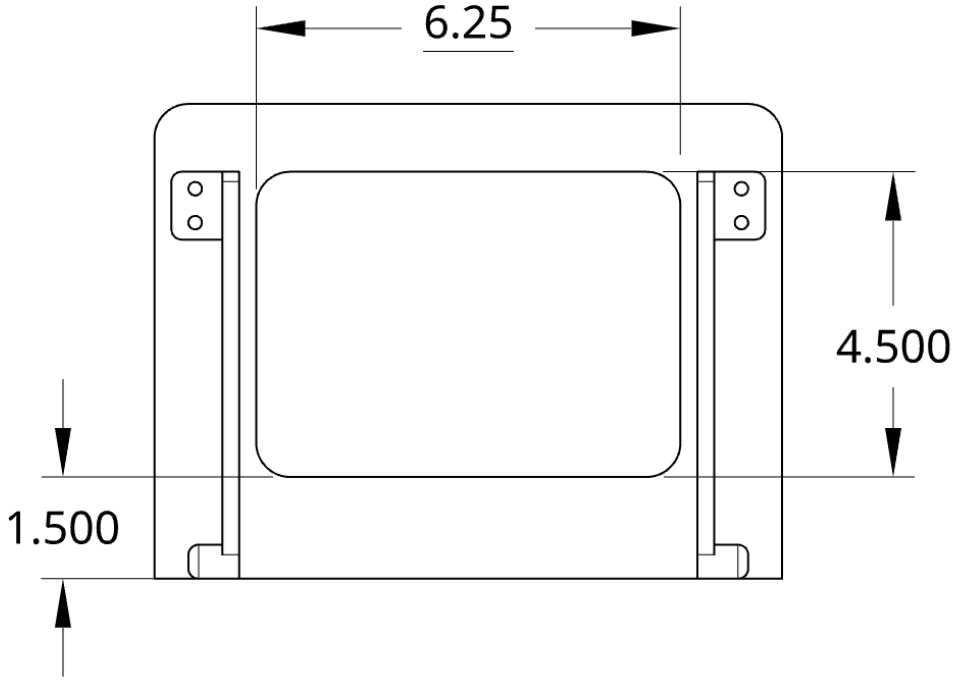



# Reef

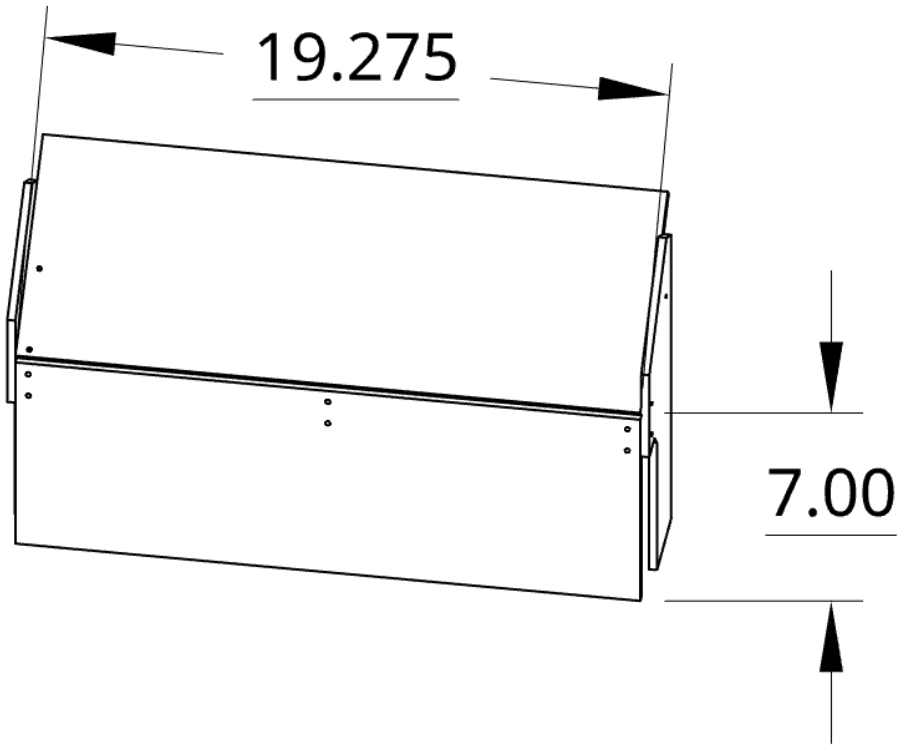



(Each Reef Branch is ¼” Polycarb)

# Processor

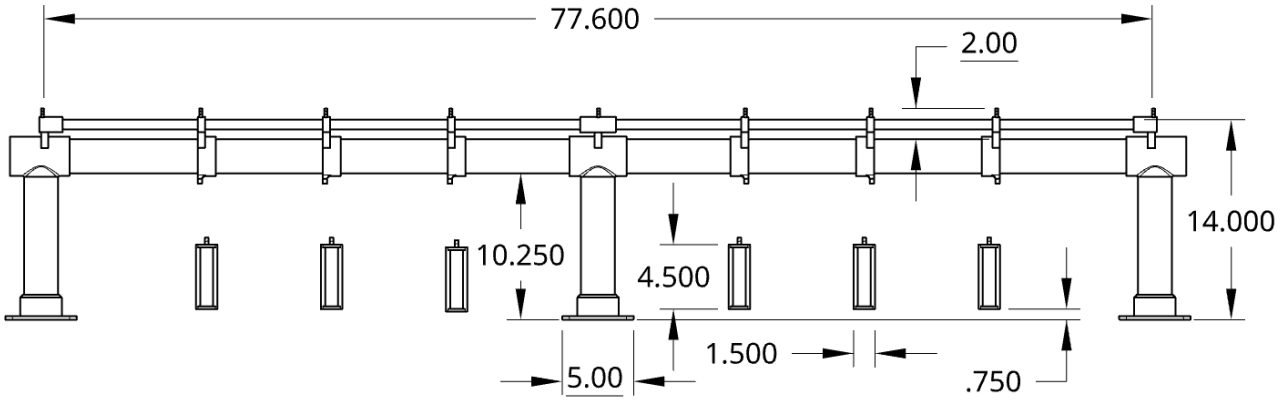



# Coral Station

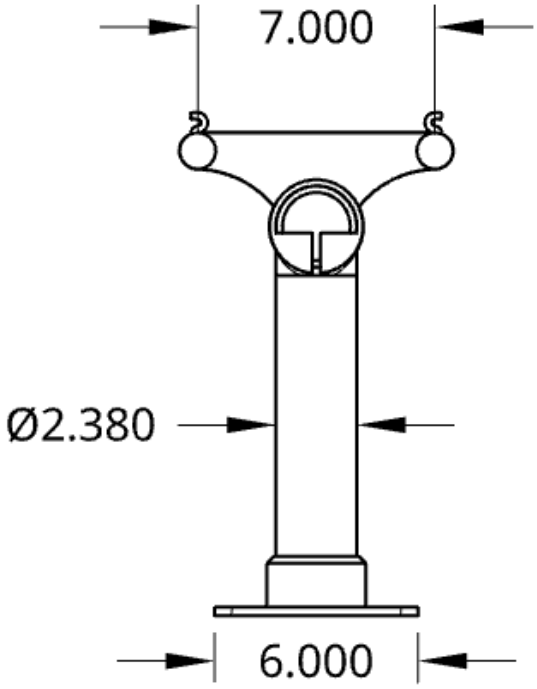



# Barge

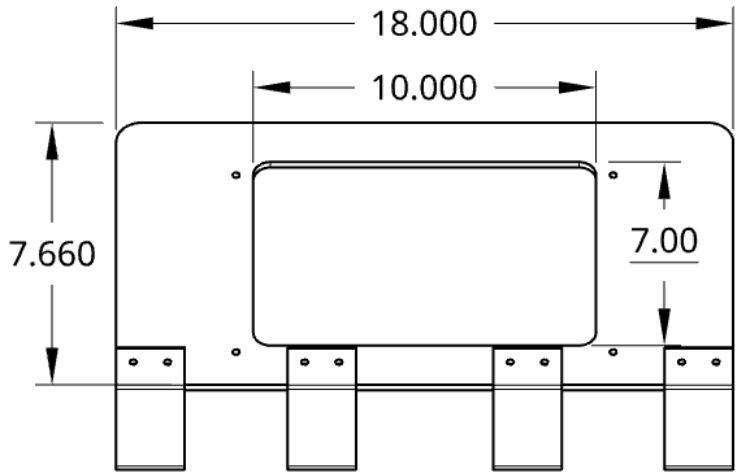
Side

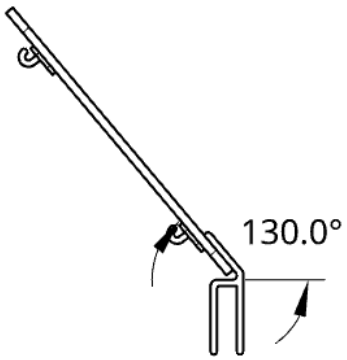



Profile

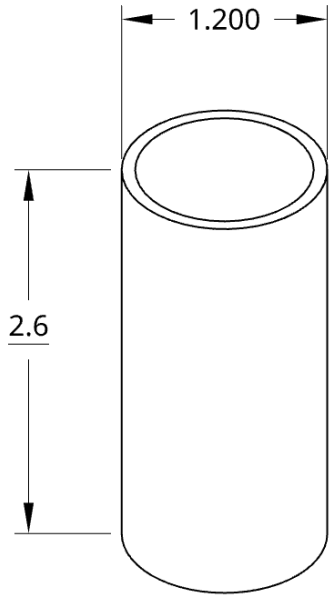


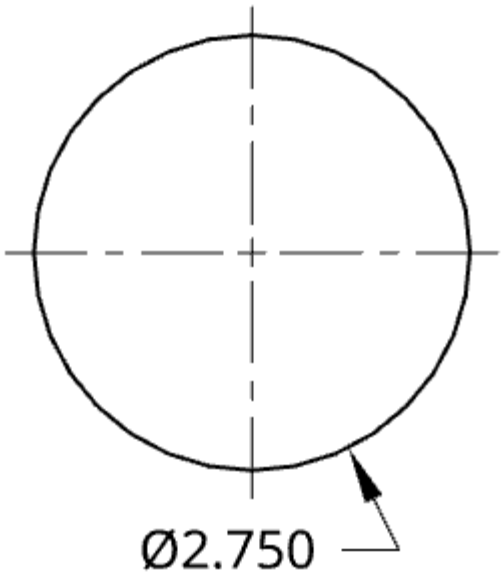

**Abyss**




**Coral** **Algae**




For Any Dimensions Not Found Above, Use Our CAD:

[Mini-FRC Field]