

# New 3D Dimensions™ powered by Braskem

Braskem America, Inc. (“Braskem” or “Company”), the leading producer of polymers in the Americas, is sponsoring New 3D Dimensions™ (the “**Competition**”). The Competition is open to teams (as defined below) from universities and colleges located in the United States (individually, a “**College**” and collectively, the “**Colleges**”). The Competition will be conducted in two phases between September 12, 2022, and April 10, 2023.

## **ELIGIBILITY:**

Full-time undergraduate and graduate students at a College or University are eligible to be part of a team. Each team should have one (1) to four (4) students. Each team must submit a team roster with its design proposal submission. The team roster must include students’ names, biographical information, email address, and area of study. Students are limited to joining the roster of one team participating in the New 3D Dimensions™ competition.

## **DESCRIPTION OF THE COMPETITION:**

Phase 1: In Phase 1 of the Competition, each team must submit a design proposal (a “**Design Proposal**”) for a drone frame (“**Part**”) to be produced using a 3D printer and polypropylene. Each team should submit a drone frame design that intends to optimize the strength of a quadcopter frame, minimize the total weight of the drone frame, and minimize total print time. Design Proposals for a Part that is or will be used to satisfy a course requirement may be submitted. Design Proposals must be made by November 15, 2022. Submissions received by Braskem after such date may be accepted at Braskem’s sole discretion. Submissions must be made in the form of a PDF through Braskem’s designated website at [www.braskem.com/3daward](http://www.braskem.com/3daward) (the “**Submission Site**”). Limit one submission per team. **Printed Parts should not be submitted.**

Each Design Proposal submission must be accompanied by the answers to the following five items:

- (1) What design software and approach was used to produce your drone frame?
- (2) How does your drone design leverage the design freedoms that 3D printing offers as well as the material properties of polypropylene?
- (3) What is the total weight of your drone frame and how was it optimized?
- (4) What type of polypropylene filament or combination of filaments would you use to produce your design?
- (5) What non-3D printing parts are included in your drone frame design?

Properly submitted Design Proposals will be judged by Braskem to determine the top 15 Design Proposals. The top 15 Design Proposals will be invited to participate in Phase 2 of the competition

and will be notified on or about December 1, 2022. The decision of Braskem as to which team's Design Proposals will be selected to participate in Phase 2 is final and binding.

Phase 2: On or about December 1, 2022, Braskem will notify the teams which have been selected to participate in Phase 2. Braskem will provide to each such team, free of charge, four (4) spools of Braskem polypropylene filament ("**Braskem Filament**") to be used in printing the Part. To the extent that a Part would require more than four (4) spools of Braskem Filament, a team may apply to Braskem for additional material.

An STL file for a finished part (the "**Final Submission**") must be submitted to Braskem on the Submission Site no later than 5 PM EDT on March 31, 2023. Final submissions received by Braskem later than such date will not be considered. **Printed Parts should not be submitted.** Each Final Submission must be accompanied by the answers to the following items:

#### Business Case

- (1) Describe the final use case of your design and its use of polypropylene.
- (2) What were the main benefits your design achieved? Be as quantitative as possible.

#### Sustainability

- (3) Explain how you were able to consolidate parts design to minimize joints and final assembly.
- (4) Explain how you were able to optimize the strength and weight of your design through geometry or infill optimization.

#### Fit and Finish

- (5) Describe your final print settings:

What brand and model 3D printer did you use?

What size nozzle did you use?

What slicing software did you use?

What bed adhesion solution or method did you use?

Did your design require support material? If so, what did you use?

- (6) What combination of Braskem polypropylene materials did you use?

- (7) Did your final printed Part require additional finish work or assembly? If so, explain what you did.

(8) What challenges, if any, did you face using polypropylene to print your Part?

**JUDGING CRITERIA:**

(1) Quantitative Targeted Performance Assessment (60%)

Each Final Submission will be quantitatively assessed based on how well the printed part achieved the targeted performance in relation to the performance of other competing teams using the table below. Each category will be assessed with a maximum award of 20%. When considering the 3 targeted performance categories, this will account for up to 60% of the team's total potential score.

Team Ranking	Percentage Awarded
1	20
2	16
3	12
4	8
5	4
6	0

Drone weight (20%)

Maximum drone arm carrying capacity (20%)

Total print time (for all drone frame components (20%))

(2) Design Creativity (20%)

Uniqueness of design

Design aesthetics

Storage and integration of the electronics, wiring, and motors

Design safety features

Landing functionality

Utilizing multiple materials

(3) Sustainability/Design Optimization (10%)

Part consolidation and integration to minimize joints and assembly

Part orientation and geometry to minimize support material

Sustainable material content

(4) Fit and Finish of the final printed part (10%)

Final Part resolution

Type of post-processing (if any) was required to achieve final surface finish (i.e sanding, grinding, CNC, sandblasting, etc.)

Textures and finish

The team whose Final Submission receives the highest total score will receive the First Prize; the team whose Final Submission receives the second highest total score will receive the Second Prize, and the team whose Final Submission receives the third highest total score will receive the Third Prize. Prizes are described below in “**PRIZES**”. Decisions of the judges are final and binding.

**NOTIFICATION OF WINNERS:**

On or about April 17, 2023, Braskem will notify the winning teams. If a potential winning team is disqualified for any reason, the team whose final submission received the next highest total score will be chosen as the prize winner. Members of the winning team will be required to submit a current photo.

**PRIZES:**

Three (3) prizes will be awarded. The first prize will be \$10,000. The second prize will be \$5,000 and the third prize will be \$2,500. In the case of a tie, prizes will be aggregated and divided between the applicable Teams. For example, if there is a two-way tie for second place, the second and third prizes will be added together and divided equally between the two Teams.

**PROPERTY AND OTHER RIGHTS:**

By submitting a Final Submission to Braskem, each Team, and each Team member, understands, acknowledges, and agrees that (1) such Final Submission will not be returned and that it will become the property of Braskem and (2) participation in the Competition constitutes permission for Braskem to use the names of the members of the winning Teams, their photos, likenesses, and biographical information, the announcement of the winning Teams and pictures of the Part without further notice or compensation.

As between Braskem and a Team, all intellectual and industrial property rights to the Final Submission and the finished Part are retained by such Team. As a condition of entry into the Competition, each Team grants Braskem a perpetual, irrevocable, worldwide, royalty-free, non-exclusive right to (1) print the Part from the Final Submission (the “**Finished Part**”) and (2) publicly display at its locations, at trade shows or otherwise, the Finished Part and to use the STL, pictures of the Part and the Finished Part for internal or external advertising purposes including, but not limited to, brochures and its website, without additional compensation.

By entering the Competition, each Team member understands, acknowledges, and agrees that all personal data submitted with an entry may be collected, processed, and stored by Braskem for the purpose of conducting and administering the Competition. Team members have the right to request access, review, correction, or deletion of any personal data held by Braskem in connection with the Competition by writing to Braskem referencing the Competition at 1735 Market Street, 28<sup>th</sup> floor, Philadelphia PA 19103.

#### **WARRANTY AND INDEMNIFICATION:**

Each Team, and each individual on a Team, warrants that the Design Proposal and the Final Submission (i) is their own original work and that they have the right to submit the Design Proposal and, if applicable, the final submission, (ii) does not infringe any third-party proprietary rights, intellectual property rights, industrial property rights or any other rights including, but not limited to, industrial designs, patent or trade secret, and (iii) does not otherwise violate applicable local, state or federal law.

To the maximum extent permitted by law, each Team, and each Team member, indemnifies and holds harmless Braskem from and against any and all liability, claims, demands, losses, costs, and expenses (collectively, "Claims") resulting from, or arising out of, any act or omission of such Team or individual and/or a breach of the warranty set forth above. To the maximum extent permitted by law, each Team, and each Team member, indemnifies and holds harmless Braskem from and against any and all Claims (including reasonable attorneys' fees) resulting from, or arising out of, (i) any misrepresentation made by a Team, or a Team member, in connection with the Competition, (ii) any non-compliance by a Team, or a Team member with the Competition rules, (iii) third-party Claims related to, or arising out of, Team's submission of a Design Proposal, Finished Part and/or a Final Submission, and (iv) any malfunction or problem with the Submission Site relating to, or arising out of, a submission of a Design Proposal or Final Submission.

#### **INTERNET DISCLAIMER:**

Braskem is not responsible for any malfunction of the Submission Site due to system errors, failed, incomplete or garbled computer transmission malfunctions, hardware or software failures of any kind or unavailable network connections, technical malfunctions of any network, cable connections, servers or providers, or computer equipment, traffic congestion on the internet or at the Submission Site or any combination thereof which may limit a Team or any Team member to participate in the Competition. Braskem reserves the right to disqualify any Team, or member thereof, who violates or interferes with the Competition in any manner.

#### **RIGHT TO CANCEL, MODIFY OR SUSPEND THE COMPETITION**

If, for any reason, the Competition is not capable of running as planned, including infection by computer virus, bugs, tampering, fraud, technical failures, or any other cause which corrupts or affects the administration, security, fairness or proper conduct of the Competition, Braskem reserves the right, in its sole discretion, to cancel, terminate, modify or suspend the Competition.

Any attempt to deliberately damage the Submission Site or any other website or to undermine the operation of the Competition is a violation of civil and criminal laws. Braskem reserves the right to seek damages or other remedies from any person or persons responsible for any such attempt to the fullest extent permitted by law.

#### **GOVERNING LAW AND ARBITRATION**

The rules of this Competition are governed by the laws of the Commonwealth of Pennsylvania without regard to any conflict of laws provisions. If any provisions of these rules are held to be invalid or unenforceable, all remaining provisions will remain in full force and effect.

By entering the Competition each Team and each Team member agrees any dispute, claim or demand related in any way to this Competition will be decided by binding arbitration conducted by the American Arbitration Association in Philadelphia, Pennsylvania before one arbitrator to be selected by the parties. To the fullest extent permitted by law, each Team and each Team member expressly waives the right to litigate, seek injunctive relief or any other recourse to judicial or other procedure in the case of a dispute, claim or demand.

#### **QUESTIONS**

Questions about this Competition or the rules should be emailed to: [3Dprinting@braskem.com](mailto:3Dprinting@braskem.com).