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# OFFICIAL RULES FOR THE

## 2018 TULSA ENGINEERING CHALLENGE

### RUBBER BAND POWERED VEHICLE COMPETITION

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#### OBJECTIVE

Design, build and test a rubber band powered vehicle, which will carry a load the greatest distance.

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#### DESIGN STATEMENT

Each entrant will design and build a wheeled vehicle, powered by two rubber bands (size specified) which will transport a "load" (specified) the farthest distance on a smooth level surfaced floor such as concrete or concrete with standard business type carpeting; and remain within boundaries of a four (3) foot (0.9144 meter) wide parallel track. Speed is not a criterion.

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#### MATERIAL SPECIFICATIONS

- No vinyl LP records of any size or type may be used for wheels.
- Up to two compact discs (CDs) may be used for wheels. Not limited to using compact discs.
- As measured with the vehicle resting on the track, ready to run, the horizontal distance from the front-most axel to the rear-most axel shall not exceed 24" (61 cm) for Upper Division, 26" (66cm) for Middle Division, and 28" (71cm) for Lower Division (6<sup>th</sup> grade and under).
- The only propulsion energy source permitted is the elastic energy of two (2) rubber bands size 62 [1/4" wide x 2 1/2" long x 1/32" thick (0.635 cm x 6.35 cm x 0.0794 cm)].
- Commercially assembled vehicles are not permitted; however, commercially manufactured components may be used as parts of the vehicle.
- The "load" shall be one (1) soccer ball (international football) as defined by Federation Internationale de Football Association's (FIFA's) Law 2 for a match ready ball:

The ball is:

- spherical;
- made of leather or other suitable material;
- of a circumference of not more than 70 cm (28 in.) and not less than 68 cm (27 in.);
- not more than 450 g (16 oz) in weight and not less than 410 g (14 oz) at the start of the match;
- of a pressure equal to 0.6 – 1.1 atmosphere (600 – 1100 g/cm<sup>2</sup>) at sea level (8.5 lbs/sq in – 15.6 lbs/sq in).

**This load is commonly referred to as a size 5 soccer ball.**

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## CONSTRUCTION SPECIFICATIONS

Only official rubber bands (supplied by judges at the Challenge) can be used during the competition. Rubber bands cannot be cut and must remain with the vehicle throughout the run (one end of the rubber band can be dragging from the vehicle at the end of the run).

The "load," supplied by judges at the Challenge, may be secured to the vehicle by means of guard rails, etc., but cannot be tied, strapped or taped to the vehicle. The "load" must be easily positioned and removed from the vehicle.

Propulsion of the vehicle must be through the wheels (i.e., no propellers, etc.). Transferring the energy of the rubber bands via gears, fly-wheels, etc., is encouraged.

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## COMPETITION SPECIFICATIONS

1. Up to three (3) runs will be permitted within a five minute time frame. Repairs and adjustments are permitted between runs. Five minute time period begins with start of first run. A run which is launched before the end of the five minute period will qualify, even though not completed until after the end of the five minute period.

2. The vehicle must be self-starting (i.e., no pushing, external power starts, etc.). Contestants are permitted to hold vehicle on the starting line and simply "let go" or utilize a tripping mechanism.

3. If, while a run is in progress, the event judge(s) notice a violation of the rules that would disqualify the run, the judge(s) shall inform the contestant(s) of the infraction and allow the run to be redone if the contestant(s) can correct the infraction. The disqualified run will not count against the contestant(s) three (3) run limit; however, the five minute time limit may still be enforced.

4. Competition will run continuously during the Challenge hours, between 8:30 a.m. and 12 noon.

5. Separate tables will be provided for inspection, staging, and competition.

6. The vehicle will be placed on the competition track and will be operated by the contestant.

7. The competition area will be marked. This area will be off limits to everyone except the competitors and officials.

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## JUDGING AND SCORING

A vehicle shall be registered and operated by one and only one individual or team. NO re-registration is permitted. A team may register only one vehicle.

Each team is responsible for the security of its entry.

No time will be spent looking for or waiting for teams not present when it is their turn. Teams not present will go to the back of the line if competition hours allow.

Distance traveled after each run will be measured in feet/inches and recorded as follows:

- from starting line to front of vehicle when it stops; or
- to the point vehicle strays outside the three foot wide track; or
- to the point vehicle drops the "load", rubber band(s), and/or any part(s) of the vehicle.

In the event of multiple vehicles traveling the full length of the track, the winner shall be the vehicle that comes closest to hitting the center line mark at the end of the track. The entrant shall clearly identify the "center" of their vehicle by marking their vehicle with black ink in the presence of an event judge.

**Final score will be the vehicle's best run completed in the five minute time period.**

In the event of a tie, vehicle determined to have the most creative design will be declared the winner.

Decision of judges, during all phases of competition, will be final. Judges will determine winning entries at the close of the Challenge (winners need not be present).

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## **GENERAL**

The contest is limited to four (4) entries per division per school. Each entry may be an individual or a team project of two to four students. It is recommended that the bigger participation schools stage run-off competitions on their home campus to select the "varsity teams" to compete at TECh if they have more than 4 potential entries.

**Registration will be done via the TECh web page which can be accessed through [www.tulsaengineer.org](http://www.tulsaengineer.org).**

General Questions? E-mail: [tulsatechchallenge@gmail.com](mailto:tulsatechchallenge@gmail.com)

Questions about the vehicle competition? E-mail: [jonathan-liechti@utulsa.edu](mailto:jonathan-liechti@utulsa.edu).

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## **PRIZES**

Prizes will be awarded for three divisions as follows: Upper Division (9<sup>th</sup> thru 12<sup>th</sup>), Middle Division (7<sup>th</sup> thru 8<sup>th</sup>), and Lower Division (6<sup>th</sup> grade and under). In the event of a tie, prizes will be equally distributed between winning entries.

First Place:                 \$100 cash and \$25 cash for their classroom.

Second Place:             \$75 cash and \$25 cash for their classroom.

Third Place:                \$50 cash and \$25 cash for their classroom.

Any cash prizes will be awarded by a bank check and issued to the teacher/school listed on the registration to be cashed and distributed to the winning student(s). We will mail a check to the address listed on the registration within a few weeks of the competition. If you do not receive your prize or certificates within a few weeks, please email [info@tulsaengineer.org](mailto:info@tulsaengineer.org) with your team name, school, and competition won.

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