

Interchangeable Corona Discharge Apparatus

Mechanical Engineering

Students: Arshdeep Bhatti, Marcus Powell, Faisal Al-hajri, Abdullah Al Marri, Tatiana Overturf
Advisors: Jared B. Shuman & Dr. Banerjee

FRESNO STATE

Lyles College of Engineering

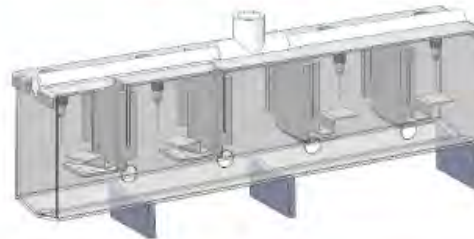
Abstract

Corona discharge is a type of electrical discharge that has many benefits. Corona discharge can be used in order to purify water and to modify surfaces. These are the primary purposes of the project being presented. The project will be able to purify water and to modify surfaces. Both are important objectives that can help solve some of the problems that are plaguing the world.

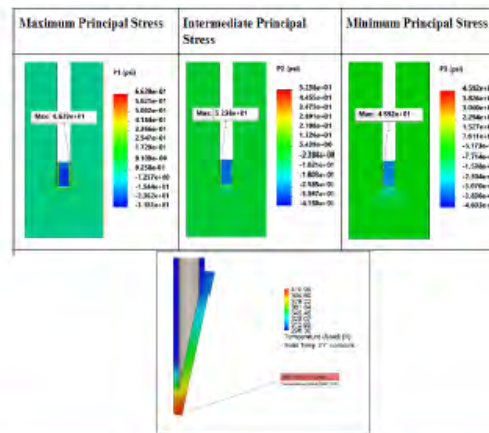
Design Details

A pump is used to move water from the contaminated source to the PVC pipe. The PVC pipe is attached to four 20-gauge hypodermic needles in a parallel manner. Water will flow through the needles and will be treated by the corona discharge. The discharge will occur between the tip of the needle and the corner of the ground sheet. The hypodermic needles will act as an electrode and the titanium sheet will act as the ground. The material used for the ground is titanium; this is done in order for the ground to be cathodic and to ensure a negative discharge. To prevent premature discharges along the needles, the needles are separated by polycarbonate walls. The design is set up so that the discharge will hit the grounds in a targeted manner. The ground serves dual functions of purifying water and to modify surfaces because it can be altered.

Solidworks Design



Design Results



Built Design



Sponsors/Conclusion

- The built design has a mesh Faraday cage surrounding it to provide safety
- Water purification tests are being done with the built design
- Thanks to Jared B. Shuman and Dr. Banerjee for providing technical support for the project