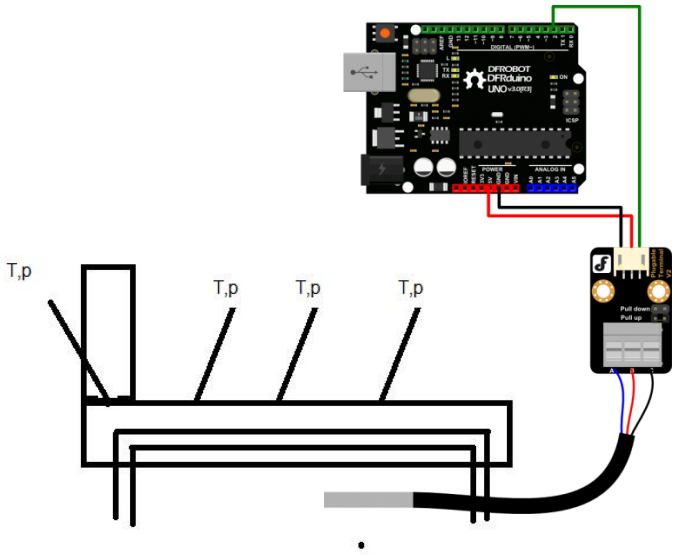
بسم الله الرحمن الرحيم

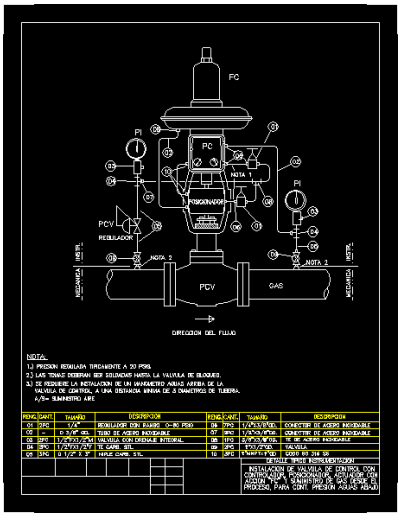
طاقة الشمال
North Lebanon Alternative Power
www.nlap-lb.com

NLAP Intrumentation Specification Document

instrumentation needed for control of the steam turbine
for the incineration test plant TEMO-IPP

تصميم لنظام التحكم





Contributions from Siham Aisha, Amena Shaker, Malak Zoebi

Editor: Amena Shaker

المضمون / Content

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

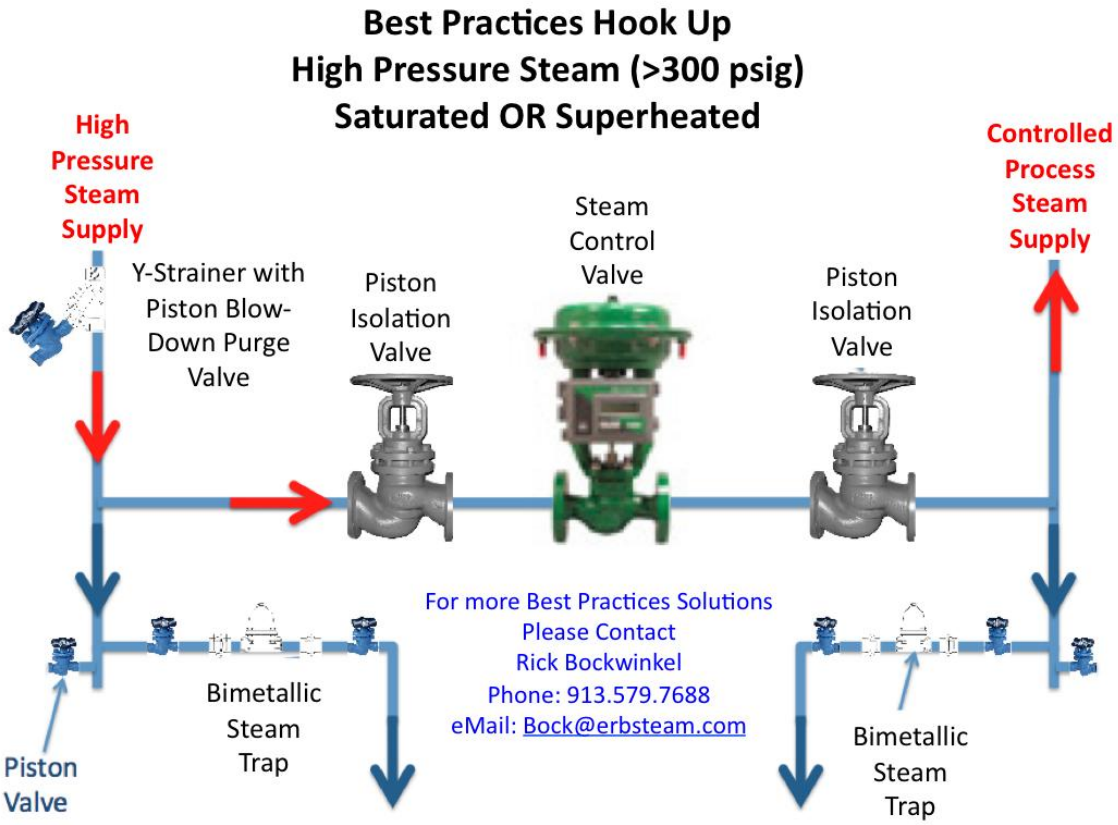
In the Name of God, the Most Merciful

Abstract / تلخيص

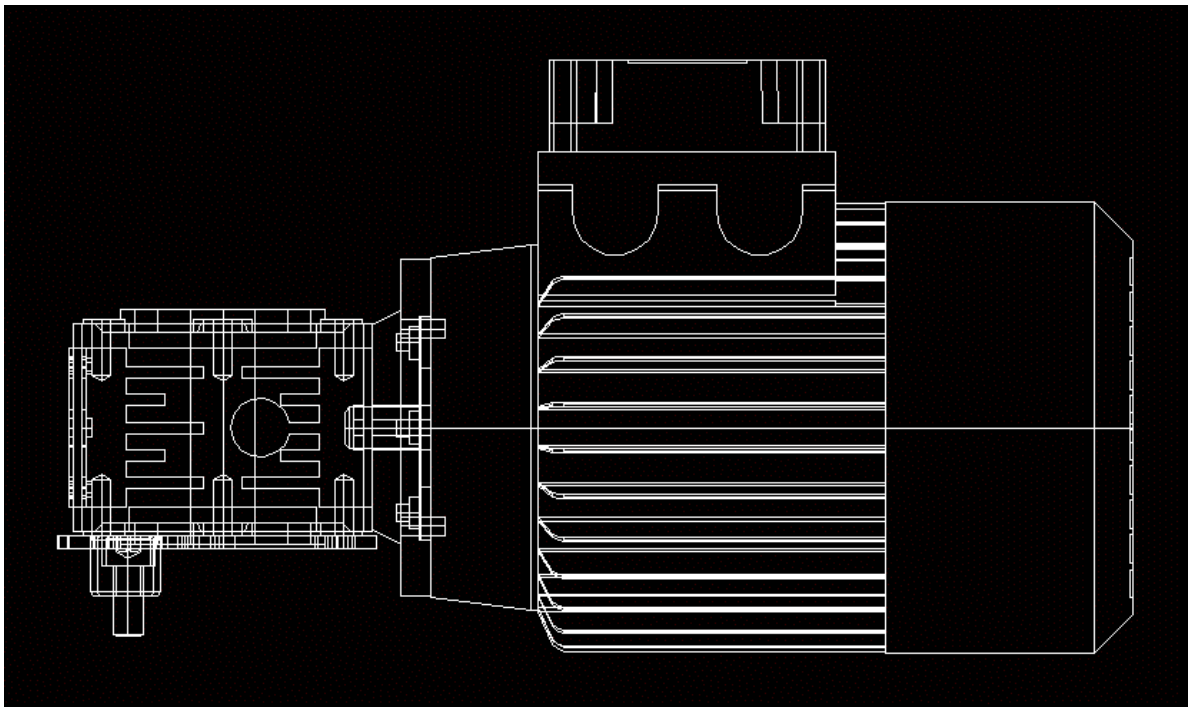
This report handles with the instrumentation needed for control of the steam turbine for the incineration test plant TEMO-IPP.

هذا التقرير يعالج الأجهزة اللازمة لتحكم التوربين البخارية لمحطة اختبار لحرق النفايات TEMO-IPP.

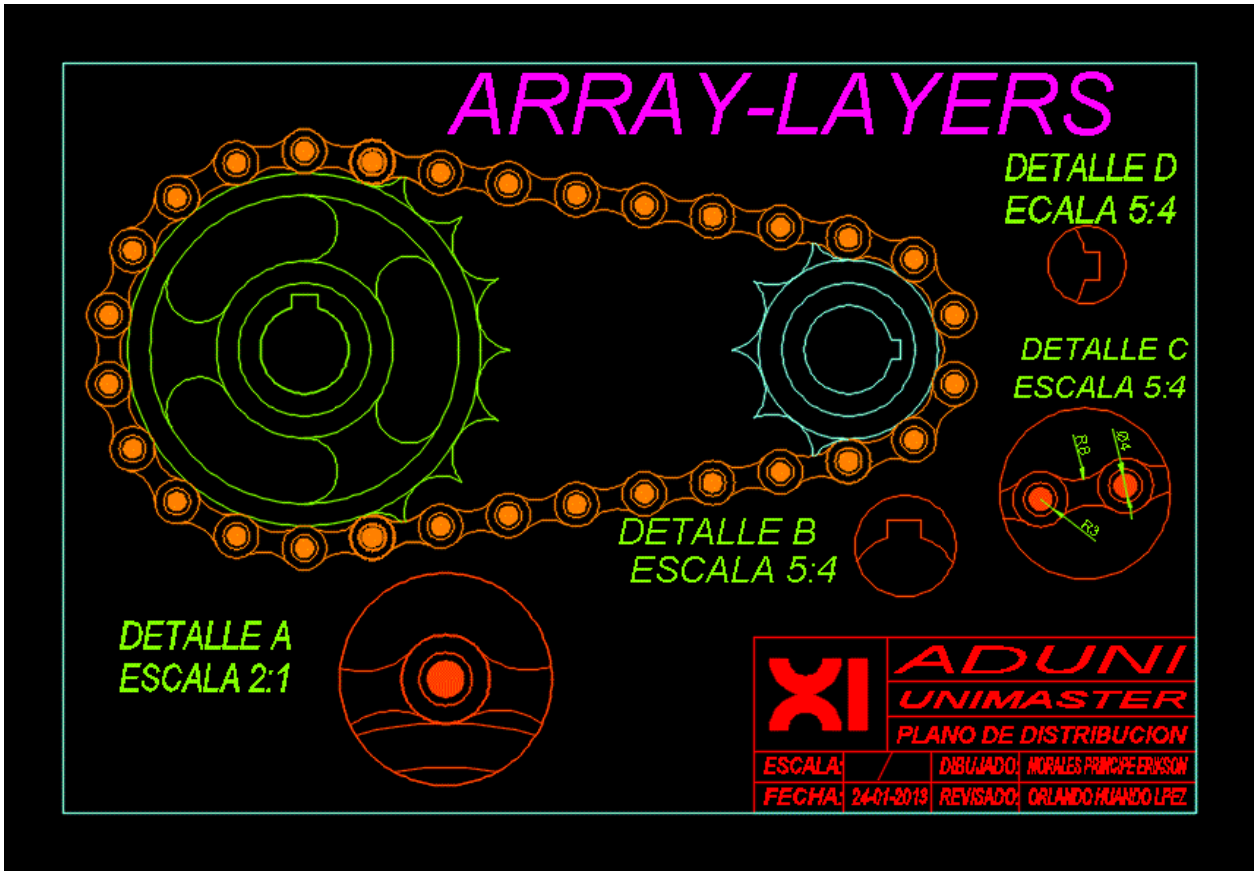
1.1 Valves (pressure controller)



Material to build an automatic ball valve

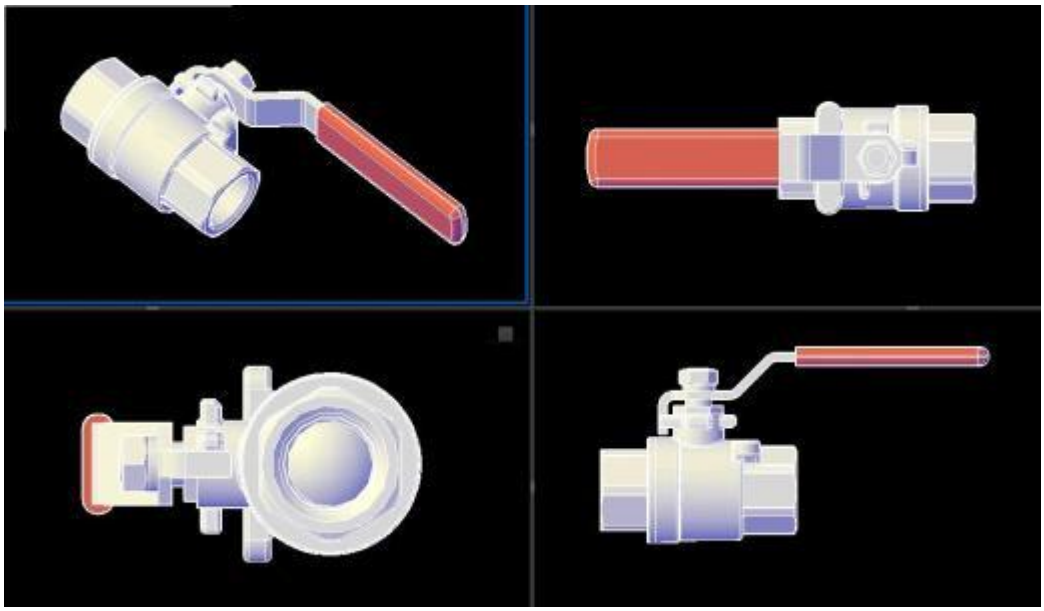


Moto gear



2D chain

Coupling



Ball valve

Condenser temperature gauge

A condenser tube contents cold water in turn cools the steam from the turbine gas abroad.

In the future projects will benefit from them through desalination and the use of spectrum. we measure the temperature in every part of the intense. condenser temperature reaches a maximum of 120 ° C and a minimum of 90 °C.

We found this the appropriate device for the condenser. Alibaba through our search on the site.

Theory: the temperature sensor PT 100

Use: Industrial

Temperature range: -55 ° C → 125 ° C

Name: Blue jay Brand

Accuracy: +/- 0.1 °C

Butterfly valve control:

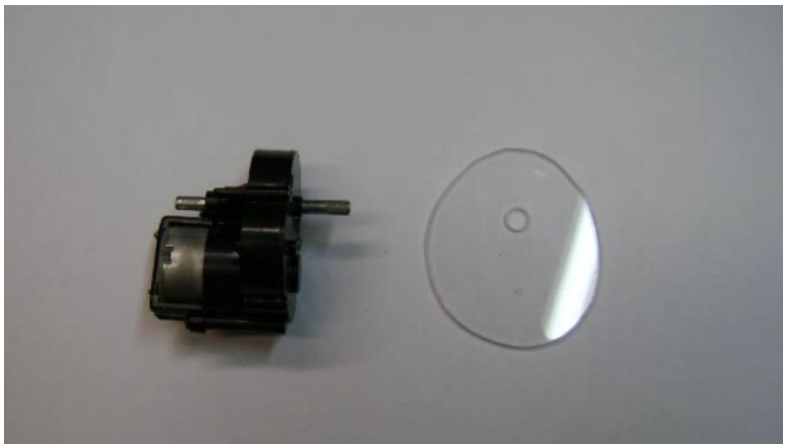
The geometric shape of a butterfly valve control (2.25 inch)

Calculate of force:

- **P=14 bar = $14*10^5$**
- **d=57mm =0.057 m**
- **r =d/2 = 0.057/2 =0.0285 m**
- **$S=\pi r^2 = 2.5*10^{-3}\ m^2$**
- **P=F/S → F = P * S = $14*10^5 * 2.5*10^{-3}$ = 3500 N**

Actuator for this valve

How build an actuator:



Motor and small acrylic plate

N.B: In our case it is not the engine considered, it is necessary to power an engine which can actuate a force of 3500 N

Motor is secured to plate

Motor shaft needs to be 90-degree angle on plate

Brass tube-3/8 O.D and a plastic nut to fit and secure with setscrews

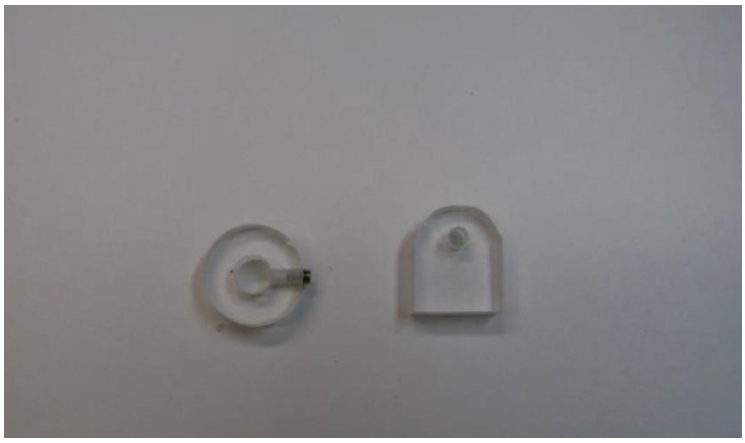
Other side of nut threaded to fit moving rod

Assembly of plunger complete

Centering ring that fits over chrome tubing and inside main housing tube

Centering ring installed

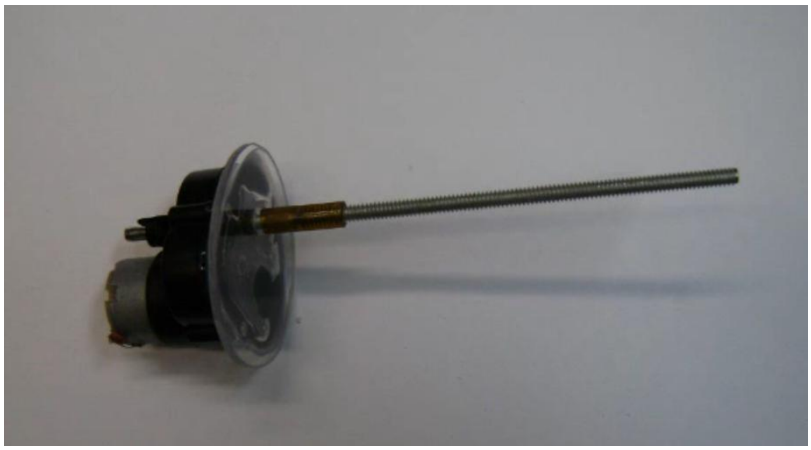
Plunger assembly test fit into tube with centering ring set screwed into place



Plunger mounting tab parts

Plunger tab assembled and test fit

Threaded rod and tubing coupler



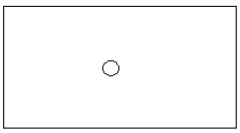
Coupler and rod fit on motor shaft

Main housing tube attached to motor plate and plunger threaded on rod

Finished assembly.

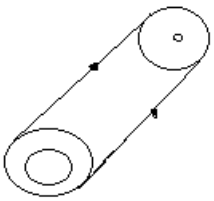
<u>List of material to make an actuator:</u>

- Motor
- Aluminum plate

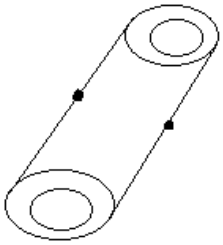


- Chrome tube

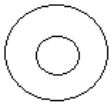
- Aluminum nut

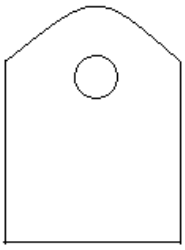


- Aluminum nut



- Tab parts

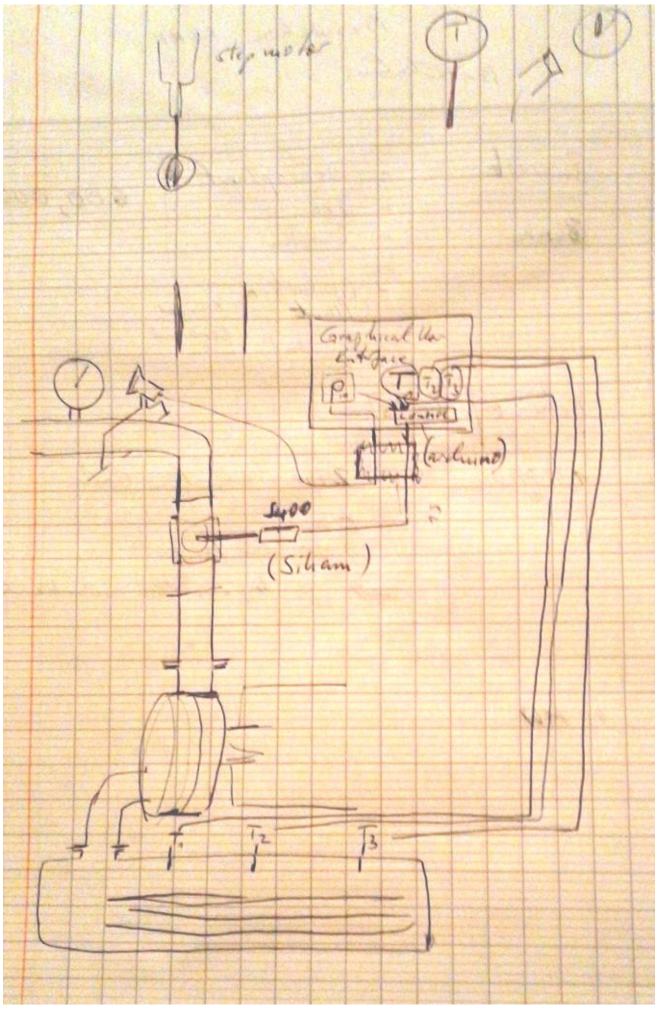


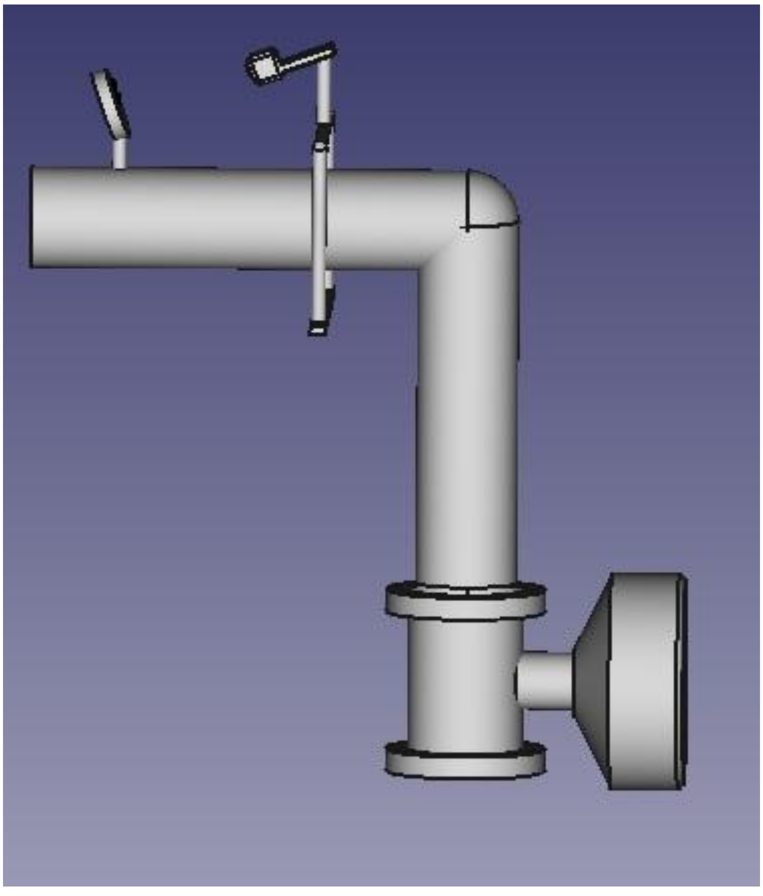


- Threaded rods

- Tubing coupler

2 تصميم النظام التجربة / Test System Design





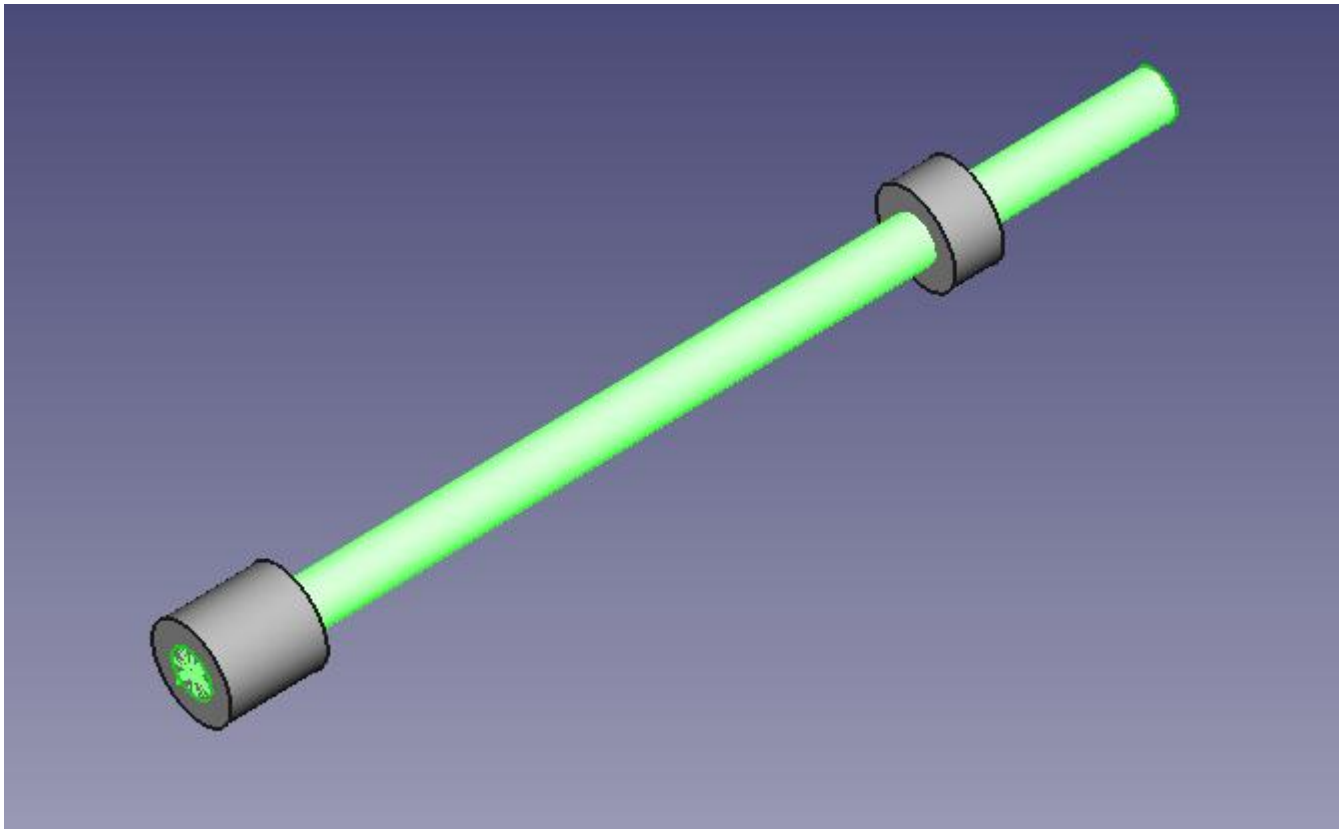


Figure 1- modulation for a plunger.

Dimensions:

Long cylinder:

- height: 20 cm
- radius: 0.5 cm

Medium cylinder:

- height: 2 cm
- radius: 1 cm

Small cylinder:

- height: 1 cm
- radius: 1 cm

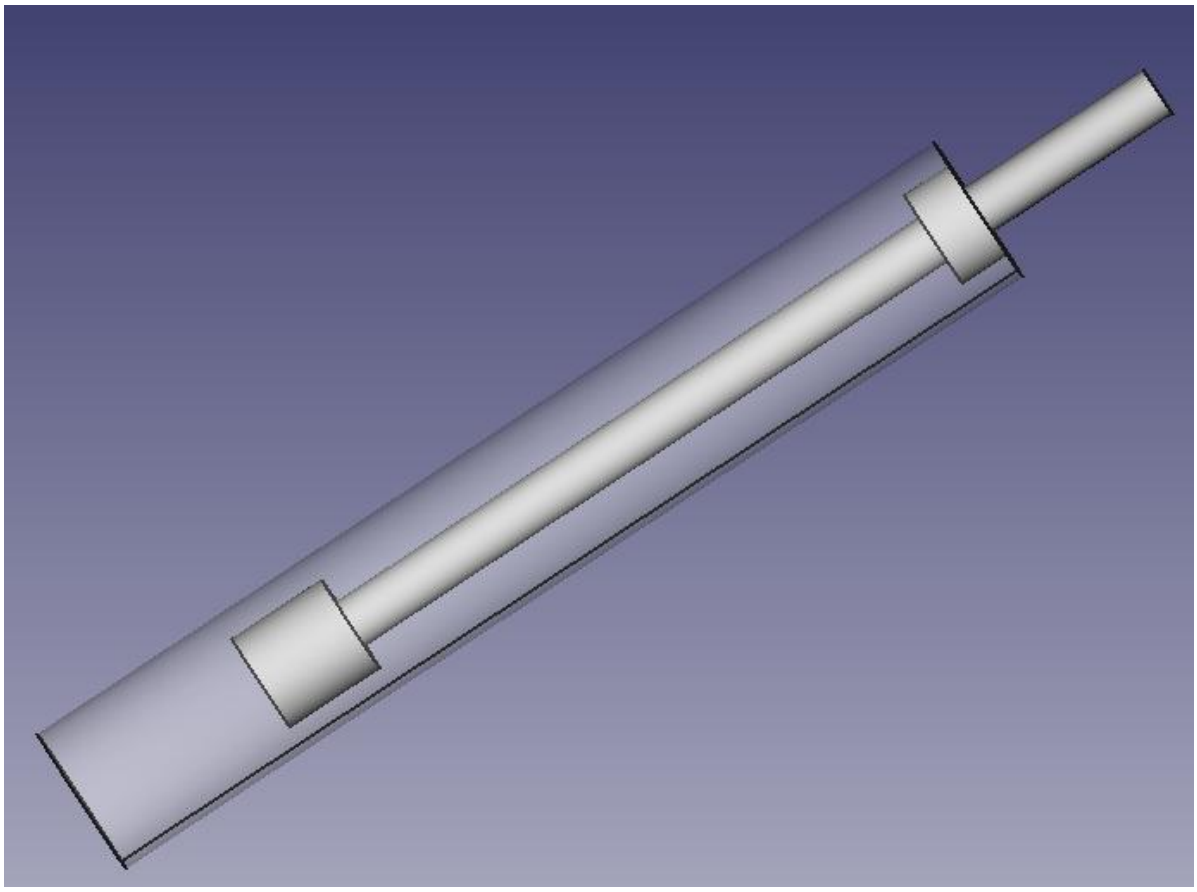


Figure 2- Plunger assembly test fit into tube with centering ring set screwed into place.

Transparent cylinder:

- height: 20 cm
- radius: 1.5 cm

plunger.FCStd

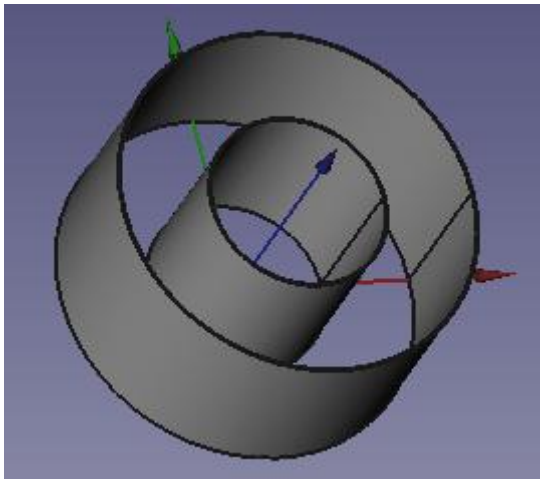


Figure 3- Plunger mounting tab parts.

plunger mounting tab parts_1_15_12_2016.FCStd

Grand cylinder:

- height: 1 cm
- radius: 1 cm
- width: 0.01 cm

Small cylinder:

- height: 1 cm
- radius: 0.5 cm
- width: 0.01 cm

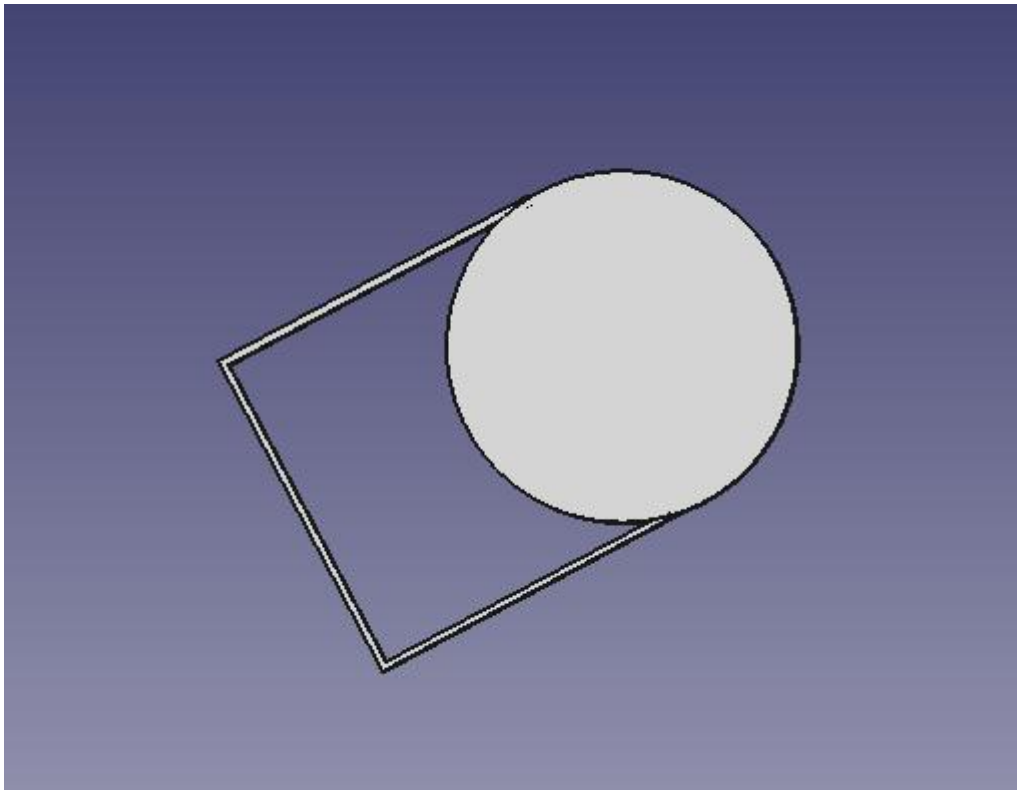


Figure 4- plunger mounting tab parts(to be continued).

plunger mounting tab parts_2_15_12_2016.FCStd1

5.1.1.1 Installation

Installation in September 2011 (picture from 21 Nov 2011)

6 Apprendix / ملحق

6.1 Apprendix A / ملحق أ

6.2 ملحق ب: تفاصيل للتكاليف

6.3