

X

NPTEL

reviewer4@nptel.iitm.ac.in ▼

Courses » Spray Theory

Announcements

Course

Ask a Question

Progress

FAQ

Unit 10 - Week 9: Practical aspects of atomizer fabrication and manufacturing

Register for Certification exam

Course outline

How to access the portal

Week 1: Introduction to sprays and atomization

Week 2: Drop size and velocity distributions

Week 3: Atomizers and their designs

Week 4: Atomizers and their designs

Week 5: Atomization theory

Week 6: Atomization theory

Week 7: Spray theory

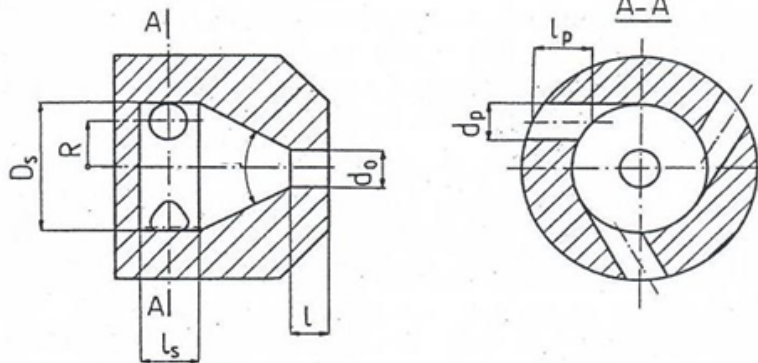
Week 8: Spray theory

Assignment 9

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

Due on 2019-04-03, 23:59 IST.



The student is asked to design an atomizer to produce uniform spray for a gas turbine engine, based on the above figure and the following data.

- $\dot{m} = 0.04 \text{ kg/s}$ is the mass flow rate of kerosene,
- $\Delta P = 3.45 \text{ MPa}$ is the pressure drop across nozzle,
- $\sigma = 0.048 \text{ N/m}$ is the surface tension of kerosene,
- $\mu = 0.00192 \text{ Ns/m}^2$ is the dynamic viscosity of kerosene,
- $\rho = 830 \text{ kg/m}^3$ is the density of kerosene,
- $C_d = 0.2$ is the discharge coefficient,
- $K = 0.09$ is the geometric constant of the atomizer,
- $\beta = 90^\circ$ is the inlet port angle and
- $2\theta = 80^\circ$ is the spray cone angle

1) Find the discharge orifice diameter, d_0 in mm

Hint

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -

A project of



In association with



Funded by

pressure swirl
atomizer-1

Design of
pressure swirl
atomizer-2

Design of
pressure swirl
atomizer-3

Design of
pressure swirl
atomizer-4

Quiz :
Assignment 9

Week - 9
Feedback Form

**Week 10:
Multiphase flow
models of
sprays**

**Week 11:
Multiphase flow
models of
sprays**

**Week 12: Spray
evaporation and
combustion**

**DOWNLOAD
VIDEOS**

2) Find the length of the discharge orifice, l in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0.9

 **1 point**

3) Find the width of tangential inlet orifice, d_p in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0.4









1 point

4) Find the diameter of the swirl chamber, D_s in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 3.15,3.2

1 point

5) Minimum length of the swirl chamber, l_s in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.6,0.65

1 point

6) Find the location of inlet slot from atomizer centre , R in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0.6

1 point

7) Find the thickness of the liquid sheet, t in mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0.2

1 point8) Find the Sauter mean diameter of the spray (based on Wang and Lefebvre correlation), D_{32} **No, the answer is incorrect.****Score: 0****Accepted Answers:***(Type: Range) 0.65,0.68***1 point**[Previous Page](#)[End](#)