NUCLEAR TRAINING COURSE

COURSE 123

1 - Level
2 - Science Fundamentals
3 - FLUID MECHANICS

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April 1978

Fluid Mechanics - Course 123

COURSE OBJECTIVES

123.00-1 - Viscosity

The student should be able to explain viscosity as the fluid property which causes the fluid to have resistance to shear in a dynamic situation and does not effect the fluid at rest.

The student should be able to explain that viscosity depends only upon temperature.

The student should be able to explain the difference between dynamic and kinematic viscosity and state the need for kinematic viscosity.

123.00-2 - Reynold's Number

The student should be able to explain the difference between laminar and turbulent flow and explain the effect of viscosity on the type of flow.

The student should be able to explain why we need to know whether the flow is laminar or turbulent.

The student should be able to explain the concept of R_E and detail the variables upon which it is dependent. The student should also be able to write the limiting values of R_E for laminar and turbulent flow.

The student should be able to calculate various quantities employing the R_E relationship.

123.00-3 - Friction in Fluid Flow

The student should be able to explain why energy is considered lost from a fluid system and the form that the energy loss takes and the type of energy that has to be replaced as a result.

The student should be able to detail the dependent variables associated with the friction loss in turbulent flow.

The student should be able to explain friction factor and show how this dimensionless ratio is achieved.

The student should be able to write the relationship between E_{LOSS} and friction factor and perform calculations based on this relationship.

123.00-4 - Minor Losses

The student should be able to explain the causes of minor losses and explain how they are accounted for in pipe flow. The student should be able to perform calculations associated with minor losses.

123.00-5 - Pipe Flow Problems

The student should be able to perform complete fluid calculations using - R_E, 'f', Continuity Equation and Bernoulli's Equation.

123.00-6 - Parallel Pipe Flow

The student should know how to solve cammon parallel pipe problems recognizing that the friction loss term is the common factor in these cases. The student should know how to solve branched flow problems, recognizing that the flowrate in each branch depends on the net ΔP available.

123.00-7 - Compressible Flow

The student should know the differences between adiabatic, isentropic, and isothermal processes. The student should be able to explain need for nozzles in engineering and describe the flow processes that may occur in a convergent and a convergent-divergent nozzle.

123.00-8 - Waterhammer

The student should be able to explain the phenomenon of waterhammer, describing the way in which the pressures and velocities change. The student should be able to explain how the effects of waterhammer may be reduced. The student should be able to calculate pipe stresses when involving waterhammer.