

Tech Sheet - Propane burners

Several times in the last couple of months Ken and I have been asked about the propane burners that we use in our locomotives, why they work so well and how we made them. So I am going to interrupt my engineering series this month and answer the questions that we are often asked.

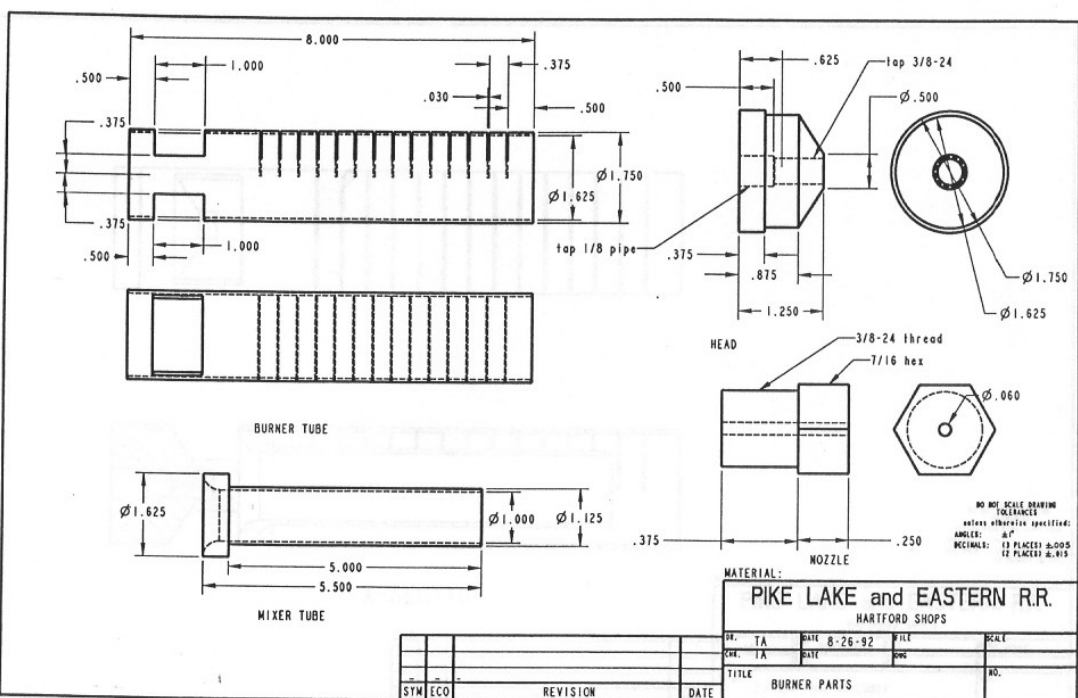
Three drawings are included that show the construction of the burner. The first one is an isometric view of the complete burner assembly. The mounting bars are approximately the size of the inside of the fire box with the inlet end either to the front or back of the boiler. The actual mounting arrangement varies greatly and is left up to the builder to figure out how to apply it to his engine. The drawing shows two burner tubes but a very small boiler might have one and a large one three. No fire pan or ash pan is required.

The second drawing shows the top view and a side cross section view of a burner tube. The tube is made up out of four parts which are detailed in the third drawing. The four parts are the burner tube, the mixer tube, the tube head and the nozzle.

In this design the fuel enters the burner by way of the tube head and nozzle and directed down the center of the mixing tube. As the fuel exits the nozzle and enters the mixing tube air is drawn in through the two slots and is allowed to mix as the fuel air mixture passes down the tube. When the fuel air mixture reached the end of the mixer tube it enters the burner tube and flows back towards the inlet end. Slots in the burner tube allows the fuel air mixture to escape and burn. Note that the end of the burner tube must be capped (air tight) with a plug or one of the mounting bars as shown. The dimensions shown are reference only and I have made burners with smaller, and larger tubes as well as longer. The only thing to remember is that it takes some distance for the fuel and air to mix well, so there is a limit on how short a burner can be. I have found that a ratio of about 5:1 between the id of the mixer tube and its length is about the minimum for good mixing in this design.

This burner is a high pressure design requiring several psi to function properly, therefore we should use a high pressure regulator on your propane tank and use a fine firing valve on the locomotive that can be adjusted accurately. Of course proper safety precautions are required like ample ventilation for the car carrying the tank and of course safety chains between the locomotive or tender and the car carrying the fuel tank.

One last word of caution, propane is heavier than air and will sink to any low area and can ignite.



MATERIAL:		PIKE LAKE and EASTERN R.R.		HARTFORD SHOPS	
DR. TA	DATE 8-26-92	FILE	SCALE		
CHK. TA	DATE	NO.			
TITLE		BURNER PARTS		NO.	
SYM	ECO	REVISION	DATE		



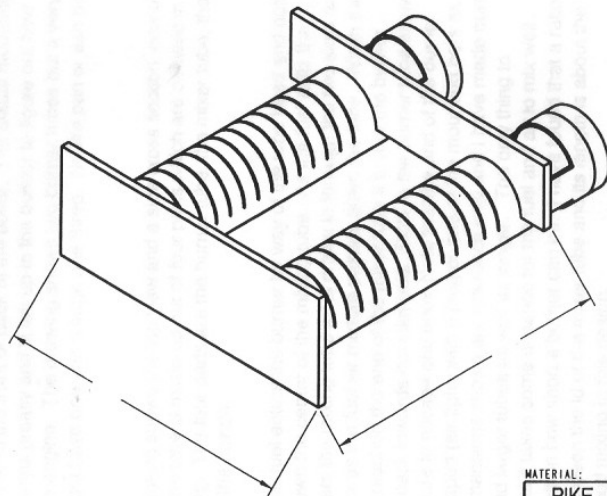
X-SECTION

DO NOT SCALE DRAWING
 TOLERANCES
 unless otherwise specified:
 ANGLES: 1/4"
 DECIMALS: (3 PLACES) 0.005
 (2 PLACES) 0.015

MATERIAL:

PIKE LAKE and EASTERN R.R.
 HARTFORD SHOPS

DR.	TA	DATE	8-26-92	FILE	SCALE	NONE
CHK.		DATE		NO.		
TITLE		BURNER TUBE ASSEMBLY		NO.		
SYM	ECO	REVISION		DATE		



DO NOT SCALE DRAWING
 TOLERANCES
 unless otherwise specified:
 ANGLES: .01"
 DECIMALS: (3 PLACES) .005
 (2 PLACES) .015

MATERIAL:

PIKE LAKE and EASTERN R.R.
 HARTFORD SHOPS

DR.	TA	DATE	8-26-92	TITLE	SCALE	NONE
CHK.		DATE		DRG.		
				TITLE	BURNER ASSEMBLY	
				NO.		
SYM	ECO	REVISION	DATE			