WORK, ENERGY, POWER

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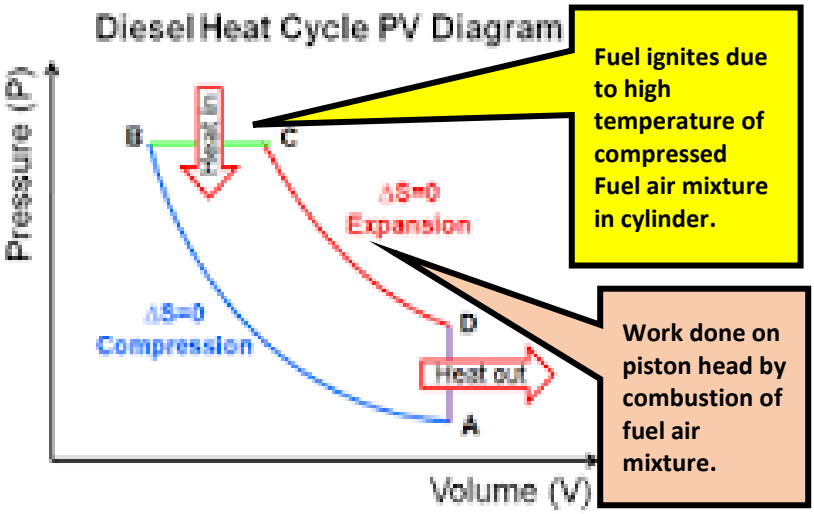
Chevrolet Silverado 2500HD, a Leviathan With a Luxury Touch



There are pickup trucks and then there are heavy-duty pickup trucks**. The Chevy Silverado 2500HD is as close as most will ever get to driving a heavy machinery.** And yet it's as quiet as a luxury car.

Unlike most people in developed countries, **Americans often use pickup trucks like cars**. The vehicles that Europeans and Japanese choose for commuting, shuttling their children and grabbing groceries could park in the bed of the Chevrolet Silverado 2500HDFord and Ram also make 2500s (3500s, too, but let's not go there today).

The 2500HD I drove was equipped with the revised 6.6-liter Duramax **diesel** V8. I saw 17 miles per gallon, a stellar number **considering Silverado's 7,300-pound weight. That engine, rated at 445 horsepower** and a jaw-dropping 910 pound-feet of torque, is paired exclusively with a 6-speed Allison transmission. The driver seemingly sits at the height of a 737 pilot awaiting takeoff instructions, and there's Boeing-like thrust off the line**: 0 to 60 miles an hour in six and a half seconds.** [**A Volkswagen GTI is only a bit quicker. Of course, the Volkswagen stops much faster because it's less than half the weight of the Chevy. Refer to your high school physics there. (in article)**

INTRODUCTION: This Silverado output power(P_{OUT}) goes into doing (output work/unit time) where W_{OUT} = Useful kinetic energy = ½ m v^2. Thus P_{OUT} = ½ m v^2/t and since

X = efficiency = P_{OUT}/P_{input} , $X = [½ m v^2]/t(P_{INPUT})$

QUESTIONS: (a) Find mass of Silverado ? (b) Convert Silverado's HP to ft. lb./s.? (c) Find efficiency X of Silverado?, (d) Does this efficiency seem reasonable for a diesel powered vehical?

HINTS:W = mg, g = 32 ft./s.^{2}, 60 mph = 88 ft./s. , 550 ft. lb./s. = 1 HP

ANSWERS: (a) m = 228.125 slugs , (b) P_{INPUT} = 244,750 ft. lb./s. , (c) X = efficiency = ~ 56% ,

(d) Gasoline **engines** are typically 30% **efficient** while **diesel engines can convert over 45% of the fuel energy into mechanical energy** (see Carnot cycle for further explanation). They have no high voltage electrical ignition system, resulting in high reliability and easy adaptation to damp environments. **Diesel**. ... In fact vehicles powered by compression-ignition **engines** are often dramatically **more** fuel **efficient than** their **gasoline counterparts. In fact they can be up to 30 percent thriftier. EXTRA: Verify what is in red above as true or false with energy concepts.**