

ENERGY-WORK-POWER

Unit 16 Dr. John P. Cise, Professor of

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The Ecstasy of Excess, the Agony of the Sticker



INTRODUCTION: Work done by engine goes to increasing the Kinetic Energy(K) of car. Output power = W_{output} / t . Input power is the stated power of engine. **QUESTIONS:** (a) Find mass(slugs) of car? (b) Find K(in ft lb) car at 60 mph? (c) Find P_{output} (in ft lb/s and HP) of car engine? (d) Given $P_{\text{input}} = 624$ HP, find efficiency of engine?
HINTS: Weight = $m g$, $KE = \frac{1}{2} m v^2$, efficiency = $P_{\text{output}}/P_{\text{input}}$, 1 HP = 550 ft. lb./s
ANSWERS: (a) 168.12 slugs, (b) 650,980 ft. lb. (c) 147,950 ft. lb./s, 269 HP, 0.43 or 43 % efficient
Comment: Normal engines are ~ 20 %, Turbos usually 20% MORE efficient. Thus, 43% is good.

BIG SUR, Calif. — While the Rolls-Royce Wraith is derived from the Ghost sedan, the fastback design creates an undeniably dashing profile. But at first I questioned the adoption of rear-hinged cabin doors on a 17-foot-long coupe **((weighing 5,380 pounds))**. The doors are big and heavy enough to be used on a bank vault and close with the same resolve. Fortunately, buttons on the front windshield pillars control the door with electronic precision. If seated in the rear, you'll have to make an undignified lunge to reach those controls — or wait for a servant to release you. What I never doubted for a moment, and weeks later remains the Wraith's most indelible impression, is the Empire-size powertrain. The ability for this beast of a car to go **((from a standstill to 60 miles per hour in 4.4 seconds))**, or to reach a maximum speed of 155 m.p.h., is almost beside the point. It's the inexhaustibility of the acceleration that knocked off my Argyle socks. The sleek look and bounteous power give the Wraith a youthful edge over other Rolls models. "We had to **power up our 6.6-liter twin-turbo v12,**" said Mr. Harnett, noting that changing the intake and exhaust tuning helped to wring 60 more horses out of the engine, bringing the **((total horsepower to 624))**. Peak torque was increased to 590 pound-feet over a broad range of engine speeds, from 1,500 to 5,500 r.p.m. The Wraith is not meant to be an agile sports car. Instead, the brute force of its engine, the relaxed yet alert response from steering wheel movements and the syrupy 8-speed transmission combine to make the driving experience effortless. The Wraith is not about feeling the road. It's about owning it.