

WORK-ENERGY-POWER

Units 10 & 11 Dr. John P. Cise,

Professor of Physics, Austin Com. College, NRG Campus, Austin Tx. & NYTimes, March 31, 2017 by Tom Voelk



INTRODUCTION: The purpose of this application is to find efficiency X of this Hybrid NSX Honda Acura 2017. Output Power $P_{\text{OUTPUT}} = X P_{\text{INPUT}} = \text{Work}_{\text{OUT}}/\text{time} = W_{\text{OUT}}/t = [1/2 m V^2]/t = X P_{\text{INPUT}}$ eq. 1

Output work (actual energy passed on to wheels) goes to cars kinetic energy $\frac{1}{2} m v^2$.

HINTS: 60 mph = 88 ft./s., 550 ft. lb./s. = 1 HP, Weight = (mass) g , $g = 32 \text{ ft./s.}^2$

QUESTIONS: (a) Find mass of this 3800 lb. NSX? (b) Convert NSX HP to ft. lb./s., (b) Find X (efficiency)?

ANSWERS: (a) 118.8 slugs, (b) 315,150 ft. lb./s., (c) 44.21 %

COMMENT: High efficiency is typical of hybrids (electric + gas)

Acura NSX 2017, a Supercar in Almost All Ways

Acura revives the beloved **(((NSX name with a land rocket that produces 573 HP)))** and gobs of torque, making drivers feel invincible. And **it's also a hybrid. Honda's Acura division** — the first Japanese luxury marque in the United States — didn't aim for BMW and Mercedes the way Toyota's Lexus brand did. **Pilots will be pinned to the seat back as they go from(((0 to 60 miles per hour in a brief 3.3-second))) tear.** A few cars can beat that velocity (McLaren 570S and Audi R8 V10, to name two). But the beauty of the NSX is that it makes any driver feel invincible. Last September, I pushed an NSX maliciously on a winding, deserted Oregon road. Astonishingly, the calm Acura representative in the passenger seat suggested I drive harder. I was far more comfortable with the car's ability than I was about coughing up bail money. Did I mention this **car is a hybrid**? It might out-accelerate a Prius dropped from a building. Top speed is 191 miles an hour. **There's a twin motor unit up front, meaning each front wheel gets its own electric power source of 36 horsepower and 54 pound-feet of torque. In back, a third motor with 47 horsepower** and 109 pound-feet provides the rear tires with instant torque. **The back motor is also the starter for the bespoke 3.5-liter twin turbocharged V6. Total power provided to the right foot is 573 horsepower** and 476 pound-feet. A 9-speed dual clutch transmission snaps through gear shifts. The lithium ion battery is below the triple-pane glass panel separating the driver from the engine. The space frame is largely aluminum. Make it soft-sided. Criticisms like these are like faulting a supermodel for wearing the wrong brand of T-shirt. While the Acura isn't as powerful or exclusive as hybrid supercars like the Porsche 918 Spyder or LaFerrari, the NSX is a fifth of their price — if you could find one. **It starts at around \$158,000. The \$201,000 tally for my preproduction car includes extras like a \$9,000 carbon fiber package and \$6,000 crimson paint as deep as Gandhi's soul.** Like other supercar marques, Acura allows buyers to travel to the Marysville plant to witness the final assembly, even affix the Acura badge to the car. That would put the "Oh!" in Ohio. The tech and passion of this halo car should trickle into mainstream Acura vehicles. For those who can't afford this supercar, it may be the best thing about the NSX.