

WORK-ENERGY-POWER

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Ford Fusion Hybrid Combines Savings and Style



Driven | 2017 Ford Fusion Hybrid

Toyota often comes to mind when it comes to hybrids, but Ford offers an efficient system that goes easy on a gallon of gas. Buyers might buy it for the looks alone.

There was a time not so very long ago when a vehicle's high fuel economy was something worth bragging about (you know who you are, Prius owners). Then gasoline became cheap and hybrids began stacking up like so much cordwood on dealership lots. Some buyers still seek lofty miles-per-gallon numbers, but the clear trend has been toward bigger, thirsty vehicles. At least until gas hits \$4 again.

(((Power is provided by a 141-horsepower, 2-liter 4-cylinder, Atkinson-cycle gasoline engine, teamed with an 88-kW electric drive motor. Through the arcana of automotive math, that adds up to a total horsepower of 188))).

With deep low-end torque, this machine feels quick enough off the line in urban traffic, but the power curve drops off as speed climbs. **(((With zero-to-60 runs clocking in at about 9 seconds,)))** the Hybrid is about fuel economy. If you want fast from a Fusion, go with the new turbo V6 Sport model.

QUESTIONS(CONTINUED): (e) At Ford.com it is stated the 88-Kw ELECTRIC DRIVE MOTOR has a Peak Battery Power of 35 Kw. Convert Peak Battery Power of 35-Kw TO HP?, (f) Show that Peak Battery Power in HP units + 141 HP gasoline engine = 188 HP as stated in the article as the TOTAL HP?

MORE HINTS: 746 Watts = 1 HP , KW = 1000 watts ,

ANSWERS: (a) mass = 114.625 slugs, (b) 103,400 ft. lb./s. , (c) ~ 0.477 or 47.7 % ~ 48 % (d) Hybrid(gasoline – Electric) usually are about 50% efficient. Hybrids are 5 to 10 % more efficient than twin turbos which are about 40 % efficient, (e) 35 KW = ~ 46.9 HP , (f) 141 HP (gasoline) + 46.9 HP (electric) = 187.9 HP ~ 188 HP

COMMENT: As a gasoline electric Hybrid this Ford Fusion Hybrid's efficiency of ~ 48% fits the pattern of car Efficiency for Hybrids.....usually close to 50%.

INTRODUCTION: This 2017 Fusion Hybrid output power(P_{OUT}) goes into doing (output work/unit time) where W_{OUT} = Useful kinetic energy = $\frac{1}{2} m v^2$. Thus $P_{OUT} = \frac{1}{2} m v^2/t$

X = efficiency = P_{OUT}/P_{input} ,

$$P_{OUTPUT} = X P_{INPUT} = \frac{1}{2} m v^2/t$$

At Ford.com: Weight of Fusion Hybrid is listed as 3668 lb.

QUESTIONS: (a) Find mass of Fusion in slugs?
(b) Convert input power of Fusion to ft. lb./s.?,
(c) Find efficiency X of Fusion Hybrid? (d) Comment on result?

HINTS: 60 mph = 88 ft./s., weight = $m g$, $g = 32 \text{ ft./s.}^2$