

WORK-ENERGY-POWER

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DETROIT AUTO SHOW

A Parade of Positive Thinking, Paced by a New Corvette



SHOW-STOPPER The next generation Chevrolet Corvette was among the new vehicles unveiled in Detroit.

DETROIT — Cobo Center has 723,000 square feet of exhibition space, enough to spotlight hundreds of new cars. Mysteriously, as journalists gathered here last week for press previews of the [North American International Auto Show](#), it seemed as if there was room for only one vehicle: the 2014 Corvette.

Multimedia

Gallery: [Show Highlights](#) Chevrolet's 2014 Corvette Stingray revived a storied sports car name, ruling the show the way it hopes to rule the street. And General Motors hopes the 450-horsepower Stingray — powerfully reloaded for a post-recession comeback — can help to revive the company in both symbolic and sales terms. **BENTLEY Perhaps counterintuitively, Bentley sales are booming again. The handcrafted \$238,000 Continental GTC Speed convertible follows suit with a 616-horsepower twin-turbo W-12 engine that booms to 60 m.p.h. in 4.1 seconds, to 100 in 9.7 seconds and continues on to 202 m.p.h.**

INTRODUCTION: AS seen below....The **BENTLEY** Perhaps counter intuitively, Bentley sales are booming again. The handcrafted \$238,000 Continental GTC Speed convertible follows suit with a **(616-horsepower)** twin-turbo W-12 engine that booms **(0 to 60 m.p.h. in 4.1 seconds)**, to 100 in 9.7 seconds and continues on to 202 m.p.h. **Actually, researching this cars 0-60 the time is more like 4.8 s.** This 616 HP Engine is a double turbo charged giving it a efficiency rating of 41%(0.41 of stated HP). Effective HP to be converted into Kinetic energy for this Bentley is $(0.41)(616) = 252.56$ hp

INTRODUCTION CONTINUED: Work(W) is needed to accelerate the Bentley to 60 mph giving it kinetic energy(KE). Thus, $W = \Delta(KE)$. Power (P) = W/t , $P(\text{effective}) = (1/2mv^2)/t$. If we wanted to solve for the mass(m) of the Bentley we need to solve for m in the last equation: $m = 2Pt/v^2$. Note: In English system P must be in ft.lb/s.

QUESTIONS: (a) Convert the effective HP(P)(252.56 HP) in to ftlb/s? (b) Knowing: P , t and vfind mass(m) of Bentley? Find m in units of slugs. (c) Find weight of the Bentley?

HINTS: 1 hp = 550 ft lb/s , 88 ft/s = 60 mph , $g = 32 \text{ ft/s}^2$, $W = mg$,

ANSWERS: (a)138,908 ft lb/s , (b) ~172.2 slugs , (c)~ 5510.4 pounds

NOTE: If you google the weight of the 2013 Bentley GTC you would find the weight is about 5510 lb.