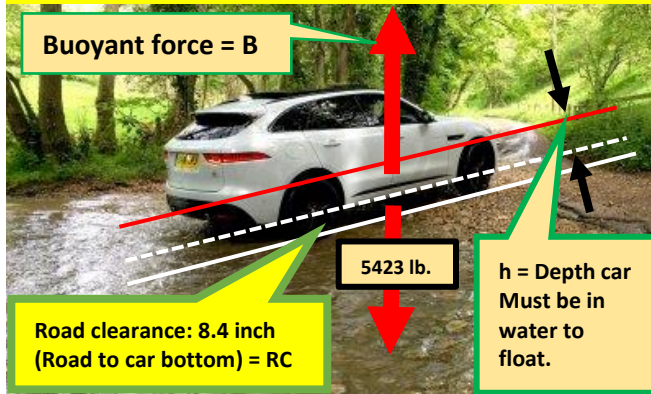


FLUIDS: BUOYANCY

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Video Review: The F-Pace Crossover Keeps Its Jaguar DNA



INTRODUCTION: Purpose of this application is to verify article statement that this car can ford (go through) 21 inches of water? Gross weight (passengers & cargo) is 5423 lb. from Jaguar site. **Archimedes principle** states objects are buoyed B up by a force equivalent to weight of fluid displaced. Thus, B must = 5423 lb. Thus, we just must find depth h car needs to displace for sufficient amount of water to float. $h + RC$ must be > 21 inches. This car from Jaguar site is 186 inch. by 82 inch (L & w). Water density is 62.4 lb./ft.³ = D , **D = Weight/V,**

QUESTIONS: (a) Convert L & w to feet? , (b) Find depth h car must be submerged to float? , (c) Find $h + RC$? , (d) Thus. Can this car ford 21-inch depth water??

HINTS: 12 inch = 1 ft., $D V = D (L w h) = \text{weight} = B$

ANSWERS: (a) L = 15.5 ft., w = 6.833 ft., (b) h = 0.821 ft. = 9.84 inch, (c) $h + RC = 18.24$ inches, (d) NO!

Jaguar has produced beautiful sedans, coupes and convertibles over the years. The F-Pace is the first crossover from the formidable team of Jaguar's design director, Ian Callum. Its largely aluminum skin is a fetching compilation of curves that somehow manages to evoke the F-Type coupe, a machine with no prayer of carrying a family. Because **Jaguar and Land Rover are owned by the Indian conglomerate Tata**, it might have made sense for Jag engineers to walk across the hall and borrow the architecture from the Land Rover Evoqua or Range Rover Sport. Didn't happen. Underpinning the F-Pace is the aluminum-intensive platform found beneath Jaguar's XE and XF sedans. **The 3-liter motor comes in two flavors, with 340 horsepower and 332 pound-feet of torque motivating the R-Sport model I tested or an additional 40 horsepower when tuned for the S model. Jag claims 0-to-60 sprints in 5.4 seconds with the R-Sport and 5.1 seconds with the S.** On recommended premium petrol, I saw 19 miles per gallon against the E.P.A.'s rating of 18 city and 23 highway. Surely, better mileage can be eked out of the not-yet-rated **2-liter turbo diesel with 180 horsepower and 318 pound-feet of torque.** The sleek urbane design might give the impression that dirt roads are best avoided. Not so. **A full 8.4 inches of ground clearance and finishing school at Land Rover proving grounds give the Pace moderate off-road prowess and a claimed ability to ford nearly 21 inches of water.** F-Pace **begins at \$41,985 for the diesel model.** Jaguar is among the last of the premium brands to get a crossover. F-Pace was worth the wait.