X-1R Global Ltd

To:	All X-1R distributors	**From:**	Nigel (Mac) McKenzie
Cc:		**Date**	22nd May 2013
Subject:	Just what do those letter mean		

Recently I was in the process of buying a new car, the performance figures for the car that I was interested in were quoted as 150PS. Being a bit old school I was wondering what this meant and how it related to HP or BHP or kW or WHP. This got me thinking, just what do these initials mean and from where do they come.

Measurements of power really got going with the advent of the steam engine when people, mostly engineers actually, began to make a comparison between horses and engines. The pioneer, James Watt the inventor of the Steam Engine suggested a revolutionary idea of labeling the power of an engine as a comparison to something that everyone understood the horse. Watt observed that a horse could turn a mill wheel 144 times and hour, or 2.4 times a minute. Thus if the wheel had a radius of twelve feet the horse would travel 2.4 x 2 pi x 12 feet in one minute. Watt therefore deduced that a horse could pull with the force of 180lbs and thus;

$$power = \frac{work}{time} = \frac{force \times distance}{time} = \frac{(180\ \text{lbf})(2.4 \times 2\pi \times 12\ \text{ft})}{1\ \text{min}} = 32,572 \frac{\text{ft} \cdot \text{lbf}}{\text{min}}.$$

Of course not all horses are equal and thus after long observations Watt's finally settled on 33,000 ft lb f/min figure that when converted into SI gives 745.699W and therefore;

$$1\,Horse\,Power(HP) = 745.699W = 0.7457kW$$

Moving on engineers wanted to find a suitable test for measuring the power of an engine. What they came up with was quite clever, simply replace the load with some kind of resistance (brake) and measure the amount of heat produced at increasing levels of rpm. This test is known as the BRAKE HORSE POWER, or BHP and it is widely used throughout the English speaking world as it is ASME/SAE/BSI approved.

For the result to be an accurate measurement of the power a car can produce the test is conducted using the entire drive train and all of the auxiliary systems, all of which can

and do reduce the figure of power output. However it is arguably the correct figure as I want to know what sort of power my car can put out, and not just the engine.

More often now you will see power figures being quoted in PS units. This standard is from the Deutesche Institute fur Normung (German Standards Institute or DIN) and stands for Pferdestarke which means Horse Strength and is similar to BHP but it is just the engine that is being measured. In other words the DIN PS number will always be higher than the BHP reading as it is a measurement of the engine only, remember the BHP number is reduced due to the negative effect that the auxiliary systems have on the usable power of the engine.

So in future just remember that essentially PS and BHP is the same thing where the following is true;

1PS = 0.986 BHP
1BHP = 1.014 PS

Therefore the PS number will always be slightly higher than a BHP number but of course that doesn't make it better, just different. I guess those German horses are bigger than those found in the British Isles.

Nigel McKenzie.
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