Coat colour: Chestnut (*"Extension" or "Red factor"*)

Applicable breeds: Numerous breeds

The basic horse coat colours are controlled by the interaction of two genes: Extension and Agouti. The Extension gene, also known as the "Red Factor" controls the production of red and black coat colour pigment, while the Agouti gene controls the distribution of black pigment as either uniformly over the body, or restricted to the points of the horse (mane, tail, lower legs). In order to comprehensively assess the basic coat colour of the horse both this test and Bay/Black coat colour should be investigated.

The Extension gene has two variants referred to as E and e. Horses which are ee will have a chestnut basic coat colour, while those which are Ee or EE will have a black basic coat colour.

This test is particularly useful for breeders:

- To identify whether horses with a basic black coat colour carry a chestnut gene (Ee) or not (EE), and therefore whether they can potentially produce chestnut offspring. An EE horse will not produce chestnut offspring regardless of the colour of the other parent.

This test will be reported as:

EE : only the black factor detected. The basic coat colour for this horse is black and it will always pass a black gene to offspring.
Ee : both black and red factors detected. The basic coat colour for this horse is black, but will pass a black gene to offspring 50% of the time and a red gene 50% of the time.
ee : only the red factor detected. The basic coat colour for this horse is chestnut.

Typical breeding outcomes:

EE X EE = 100% EE
EE X Ee = 50% EE, 50% Ee
EE X ee = 100% Ee
Ee X Ee = 25% EE, 50% Ee, 25% ee
Ee X ee = 50% Ee, 50% ee
ee X ee = 100% ee

Please study the Horse Coat Colour Inheritance Chart below to identify probable outcomes from different mating combinations.

Reference:

Marklund L, Johansson Moller M, Sandberg K, Andersson L (1996) A missense mutation in the gene for melanocyte-stimulating hormone receptor (MC1R) is associated with the chestnut coat colour in horses. Mammalian Genome 7: 895 – 899

Horse coat colour inheritance (E-Locus and A-Locus)

		Sire								
		EEAA Bay	**EeAA Bay**	**EEAa Bay**	**EeAa Bay**	**eeAA Chestnut**	**eeAa Chestnut**	**eeaa Chestnut**	**EEaa Black**	**Eeaa Black**
Dam	**EEAA Bay**	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay
	EeAA Bay	All Bay	¾ Bay ¼ Chestnut	All Bay	¾ Bay ¼ Chestnut	½ Bay ½ Chestnut	½ Bay ½ Chestnut	½ Bay ½ Chestnut	All Bay	¾ Bay ¼ Chestnut
	EEAa Bay	All Bay	All Bay	¾ Bay ¼ Black	¾ Bay ¼ Black	All Bay	¾ Bay ¼ Black	½ Bay ½ Black	½ Bay ½ Black	½ Bay ½ Black
	EeAa Bay	All Bay	¾ Bay ¼ Chestnut	¾ Bay ¼ Black	9/16 Bay ¼ Chestnut 3/16 Black	½ Bay ½ Chestnut	3/8 Bay ½ Chestnut 1/8 Black	¼ Bay ½ Chestnut ¼ Black	½ Bay ½ Black	3/8 Bay ¼ Chestnut 3/8 Black
	eeAA Chestnut	All Bay	½ Bay ½ Chestnut	All Bay	½ Bay ½ Chestnut	All Chestnut	All Chestnut	All Chestnut	All Bay	½ Bay ½ Chestnut
	eeAa Chestnut	All Bay	½ Bay ½ Chestnut	¾ Bay ¼ Black	3/8 Bay ½ Chestnut 1/8 Black	All Chestnut	All Chestnut	All Chestnut	½ Bay ½ Black	¼ Bay ½ Chestnut ¼ Black
	eeaa Chestnut	All Bay	½ Bay ½ Chestnut	½ Bay ½ Black	¼ Bay ½ Chestnut ¼ Black	All Chestnut	All Chestnut	All Chestnut	All Black	½ Chestnut ½ Black
	EEaa Black	All Bay	All Bay	½ Bay ½ Black	½ Bay ½ Black	All Bay	½ Bay ½ Black	All Black	All Black	All Black
	Eeaa Black	All Bay	¾ Bay ¼ Chestnut	½ Bay ½ Black	3/8 Bay ¼ Chestnut 3/8 Black	½ Bay ½ Chestnut	¼ Bay ½ Chestnut ¼ Black	½ Chestnut ½ Black	All Black	¾ Bay ¼ Chestnut

Use this chart to identify the likely coat colour for offspring of parents already tested for the E-Locus and A-Locus.

These proportions are average expectations and are subject to variation due to chance.