The present work addresses the production and characterisation of iron boride layers by pack boronising of a Vanadis 6 tool steel. The boride layers were produced at 900°C for 2h using different pack compositions in order to obtain a single-phase boride layer. The layers were characterized by electron microscopy, glow discharge optical emission spectroscopy, X-ray diffraction, Vickers hardness tests and wear testing with a pin-on-disc tribometer. It was found that the type of boride phases (FeB and/or Fe2B) present in the treated layer can be controlled by changing the boron activity in the applied pack. The boronised layers result in hardness values of about 2000HV for the layers containing the FeB phase and around 1750HV for those composed of the Fe2B phase. Additionally, a very significant improvement of the wear performance, in terms of worn volume and friction coefficient, was obtained by pack boronising for all conditions as compared to the heat treated tool steel.