An industrial-scale prototype of spouted bed paddy dryer with a capacity of around 3500 kg/h was constructed and tested. The prototype was shown to be a desirable feature of spouted bed as well as capability of continuous drying and offering consistent results through the testing period. At early phase of experiments, feed rate and energy consumption were undesirable. To overcome these problems, a high pressure blower was used. Experimental results showed that the prototype performed well on moisture reduction and milling quality. However, in the experiments, difficulties were experienced in achieving high moisture reduction while high feed rates were maintained. This is due to the insufficient residence time that increased with the increase in drying chamber length. The high temperatures up to 130-160°C were applied to dry paddy from various initial moisture contents to the range of 14-25% dry basis without significant quality changing. Thermal energy consumption, which in range of 3.1-3.8 MJ/kg water, is comparable with commercial dryers. The effect on milling quality while paddy moisture is further reduced to 16-18% dry basis should be studied.