The fluidised bed drying characteristics of soybeans at high temperatures (110-140°C) and moisture contents, 31-49% dry basis, were modelled using drying equations from the literature. Air speeds of 2.4-4.1 m/s and bed depths from 10 to 15 cm were used. The minimum fluidized bed velocity was 1.9 m/s. From a quality point of view, fluidized bed drying was found to reduce the level of urease activity which is an indirect measure of trypsin inhibitor, with 120°C being the minimum required to reduce the urease activity to an acceptable level. Increased air temperatures caused increased cracking and breakage, with temperatures below 140°C giving an acceptable level for the animal feed industry in Thailand. The protein level was not significantly reduced in this temperature range. The drying rate equations and quality models were then combined to develop optimum strategies for fluidized bed drying, based on quality criteria, drying capacity, energy consumption and drying cost. The results showed that from 33.3% dry basis, soybean should not be dried below 23.5% dry basis in the fluidized bed dryer, to avoid excessive grain cracking. The optimum conditions for minimum cost, minimum energy and maximum capacity coincided at a drying temperature of 140°C, bed depth of 18 cm, air velocity of 2.9 m/s and fraction of air recirculated of 0.9. These conditions resulted in 27% cracking, 1.7% breakage and an energy consumption of 6.8 MJ/kg water evaporated.