

Longer cooling time and lower air velocity is an energy efficient way to decrease the amount of fines during pellet production

Magnus Ståhl

Karlstad University, Sweden



Abstract

Manufacturers of pellet equipment has asked for that the question of pellets cooling are investigated. The purpose is to examine how the temperature, cooling time and the velocity of the cooling air affects the durability of the pellets and the amount of fines during production. Wood fuel pellets have been produced at Karlstad University in a Pilot pellet production unit. Two cooling devices have been used, a custom built cooling tower and smaller cooling boxes where temperature, humidity, fan speed etc. are measured. Reference samples were cooled in a bucket over night and scattered in a large box on a perforated plate. All samples were cooled to ambient air temperature.

The best results for the cooling tower on the durability and bulk density was the pellets scattered in a box and left overnight. Additionally, there were a minimal amount of fine fractions. Pellets cooled with the lowest fan effect also showed good results on durability. Pellets cooled in a bucket over night got very humid, and pellet cooled at maximum fan power initiated cracks in the pellets due to a cool outside and hot inside of the pellets. The results for the smaller cooling boxes showed similar results but also showed that a lower bed height of the pellets in the boxes gave increased durability and hardness. A high fan speed gave poorer results on durability, mostly depending on that the air transport through the boxes became uneven. Further tests in an industrial environment measuring the electricity should be done.

Biography:

Dr. Magnus Ståhl, Senior Lecturer at Karlstad University, Sweden. Dissertation 2008, "Improving Wood Fuel Pellets for Household Use - Perspectives on Quality, Efficiency and Environment". Published papers on wood fuel pellets focusing quality issues, energy efficiency, environmental aspects and additives in pellets. During 2013-2014, an reference group expert in "Analysis of factors affecting the Swedish pellet market" performed by IVL (Swedish Environmental Research Institute). Chairman at the 6th International Symposium on Energy Challenges & Mechanics – towards the bigger picture, 2016 in Inverness, Scotland, UK. Teaches in Environmental and energy sciences since 1999. Performed distance education of operators at a pellet mill.

Speaker Publications:

1. Stefan Frodeson, Jonas Berghel, Magnus Ståhl, et al., (2019). The Potential for a Pellet Plant to Become a Biorefinery. MDPI. 7(4), 233.
2. Magnus Ståhl, Stefan Frodeson, Jonas Berghel, Stefan Olsson, 2019. Using Secondary Pea Starch in Full-Scale Wood Fuel Pellet Production Decreases the Use of Steam Conditioning. World sustainable energy days.
3. Are Kjeang, Venkatesh Govindarajan, Magnus Ståhl, Jenny Palm, 2017. Energy consulting services in the information age - literature review. Energy, Sustainability and Society volume 7, Article number: 30.
4. Magnus Ståhl, Jonas Berghel, Stefan Frodeson, 2017. Research Experience From The Use Of Different Additives In Wood-Fuel Pellet Production. International Journal of Energy Production and Management. 2(3); 288-293.

[15th World Bioenergy Congress and Expo](#); Berlin, Germany- April 20-21, 2020.

Abstract Citation:

Magnus Ståhl, Longer cooling time and lower air velocity is an energy efficient way to decrease the amount of fines during





pellet production, Bioenergy 2020, 15th World Bioenergy
Congress and Expo; Berlin, Germany- April 20-21, 2020

(<https://bioenergy.insightconferences.com/speaker/2020/magnus-st-hl-karlstad-university-sweden>)