HQG Visit Date:	August 28 to September 2, 2022
Farm/Facility:	Various
Picker Name & Grower Number(s):	Various
Grower Name & Phone:	Various
Physical Address of Farm/Facility:	Hallertau, Germany
Email Address:	NA
Picker Type(s) & Description:	Wolf (various models), Fuss (various models)
Merchant Partners/Direct/Both?	IGN, HVG, Barth Haas, Steiner

HQG Attendee & Brewery	
Jeff O'Neil (Industrial Arts Brewing)	
Tom Kitching (New Glarus Brewing)	
Chad Szarzynski (New Glarus Brewing)	
Sam Pecoraro (Von Ebert Brewing)	

Operations Description:

Overview: HQG visited eight family run farms in the Hallertau region over several days. Visits took place at the beginning of the harvest season with most farms just beginning to pick. Visits were led and coordinated by IGN, HVG, Barth Haas and Steiner. Fields, pickers, kilns and storage areas were all visited in a fact-finding capacity with an eye towards food and worker safety in addition to hop aroma quality. In general, conditions and practices tended to overlap greatly with many similarities amongst operations. The major differences tended to be in picking equipment and kilning equipment and practices.
Fields: overall size of farm's fields does not vary significantly, with total average around 19.4 hectares. Irrigation capability varies greatly with average around twenty percent per farm by area. Irrigation practices vary – some farms watering from top wire, some from ground. Some farms are trialing biological diversity measures to combat monoculture and deter pests. These measures include bird houses on posts and growing grape vines on support wires. Top cutters are not in use; bottom cutters are used in conjunction with pulling the bine string until it breaks. Many small farms tend to be clustered around village centers. Each individual farm usually has its own picker and kilns. We did not observe farms sharing equipment.
Pickers: Either Wolf or Fuss pickers were observed at every farm. Age and model vary as well as condition.
Kilns: Kiln size, type and practices vary greatly. Fuel varies: diesel is common as well as supplemental heat from Biomass Hot Air Generators burning wood chips. HQG recognizes that most kilns employ indirect heating; food safety concerns arise when fuel media comes in direct contact with hops, as is the case with direct fire kilns. Most kilns are small and built into the buildings that house them. We also observed multiple Czech-made belt drier kilns. Most of these models are bought used and refurbished.
Storage: in general, farms do not have cold storage. Only one farm had the capability to store cold and this cold storage was not in use. Therefore, all hops at these farms are stored at ambient temperature (estimated by farmers and merchants to be around 50F) until delivered to suppliers for processing. This time frame various from days to months. Hop bales were typically, but not always stored in stacks of eight and palletized off the ground. Bales are packed looser in this region when compared to US practices. The ability of suppliers to cold store unprocessed bales varies greatly. IGN fully relies on the storage capacity of the farmers until processing of bales, Haas and HVG make

use of cold storage facilities at St. Johann to store a portion of their bales cold, and Steiner recently opened Germany's largest hop cold storage facility. All suppliers note that processed pellets are stored cold.
Food and Worker Safety: Most farms are small and run by 5-8 family members with a small amount of seasonal workers. Worker safety is not prioritized. Signage is not common, but ear protection was observed as well as no smoking signage. Practices common in the US, like designated walkways, honking while driving, lighting and extensive signage are not common in this region. Color coding of tools and equipment and 5S practices not common. Generally, facilities are kept very organized and clean, given the age of the buildings and equipment that is used. Tracking practices are robust. Bales are all given a sticker with bar code and field information. Fields are named individually and vary in size. Programs are in place to trace bines from field through baling.
Quality: all farmers emphasized quality, but emphasis on quality of oils varies with farmer. Some farms are highly automated and focus extensively on kiln temperatures, times and even reusing hot air for downstream processing to preserve oil content.

Areas of Concern:

Ground Contact: post-harvest from the field, all farms remove bines from trucks and place them on the floor of the picking facility. Bines are then attached to the picker and come in contact with the floor until the elevation of the picker lifts them high enough to be off the floor. There is no dedicated area for where the hops contact the ground. Trucks and foot traffic overlap in these areas. Any hops that have fallen off the bine are swept from the ground of the picking facility onto the first conveyor of the picker. This was observed at most farms.
Smoking: smoking signs were observed at farms, but smoking cigarettes is common practice while processing hops. This was often observed in the staging area while workers were connecting bines to the picker. The primary concern is that cigarette ash is dropping on the ground and being swept up into the picker.
Conveyance: outdoor covered conveyance is common; indoor covered conveyance is intermittent. There did not seem to be any commonalities between facilities that would explain why some areas are covered and others not covered. Product recovery at conveyor joints is common. Hops are usually recovered in buckets and returned to product stream. Non-food grade lubricant common in storage areas.
Lighting: Covered lighting was observed in some areas, however non-covered lighting is common. This type of lighting is common in all areas of picking and kilning facilities, including over conveyance, kilns, conditioning areas and balers. If uncovered lighting is non-shatter proof, there is a concern that broken lighting can contaminate hops with glass and heavy metals.
Food and Worker Safety: exposed belts and drives very common. Most protective cages are removed and pose significant risks. Non-food grade lubricant or non-labeled greases common in storage areas and out in the open.
Cold Storage: the farms that were visited lacked operational cold storage. Almost all cold storage is provided by suppliers to varying degrees.
Birds and pests: birds were not observed in processing facilities, but when inquired, farmers usually mentioned that they were not yet present because harvest had just started. Farmers said that birds were common later into harvest. Farms are not equipped with bird netting or bird mitigation systems. No other pests were observed. Hop suppliers state that pest mitigation practices are enforced through contract and relationship frameworks with the growers. Further, every grower receives the Hygieneleitfaden Hopfen, a checklist used by growers and merchants used to ensure the hygiene of the hops and equipment.

Recommendations:

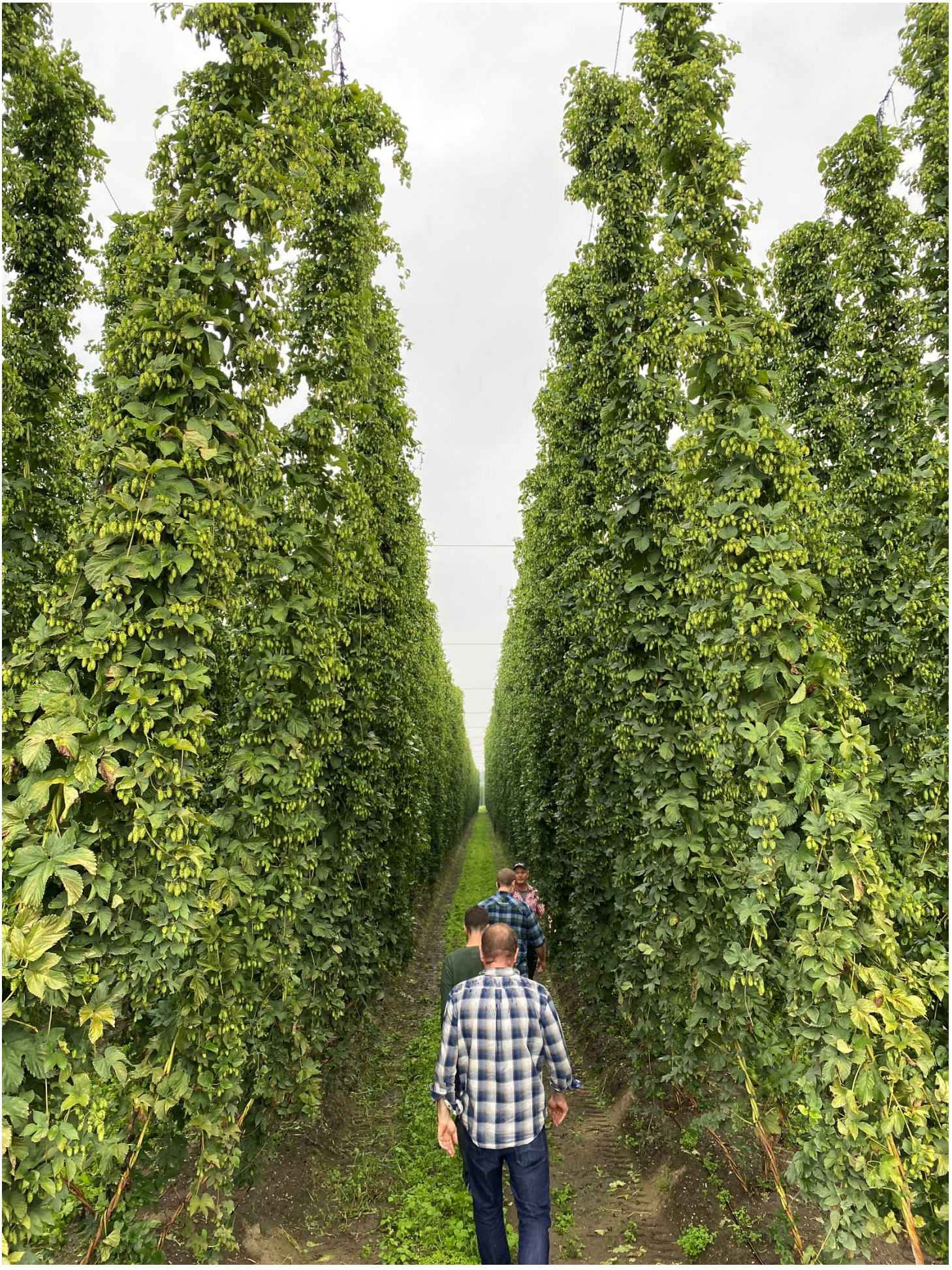
Overall: Hop Quality Group is grateful for the opportunity to have viewed multi-generational farms with such a storied history. All farmers and suppliers expressed a desire to grow and deliver the highest quality hops. This desire was evident throughout tours of farms, picking facilities and supplier facilities. HQG sees opportunities for improvements in areas such as conveyance, lighting, pest mitigation, ground contact, smoking, cold storage, and safety.
Conveyance: upgrades to conveyance to connect conveyors and mitigate product recycling needed. More covered conveyance needed.
Lighting: covered lighting and non-shatter lighting needed. Lighting located above any product stream should be shatter-proof or covered.

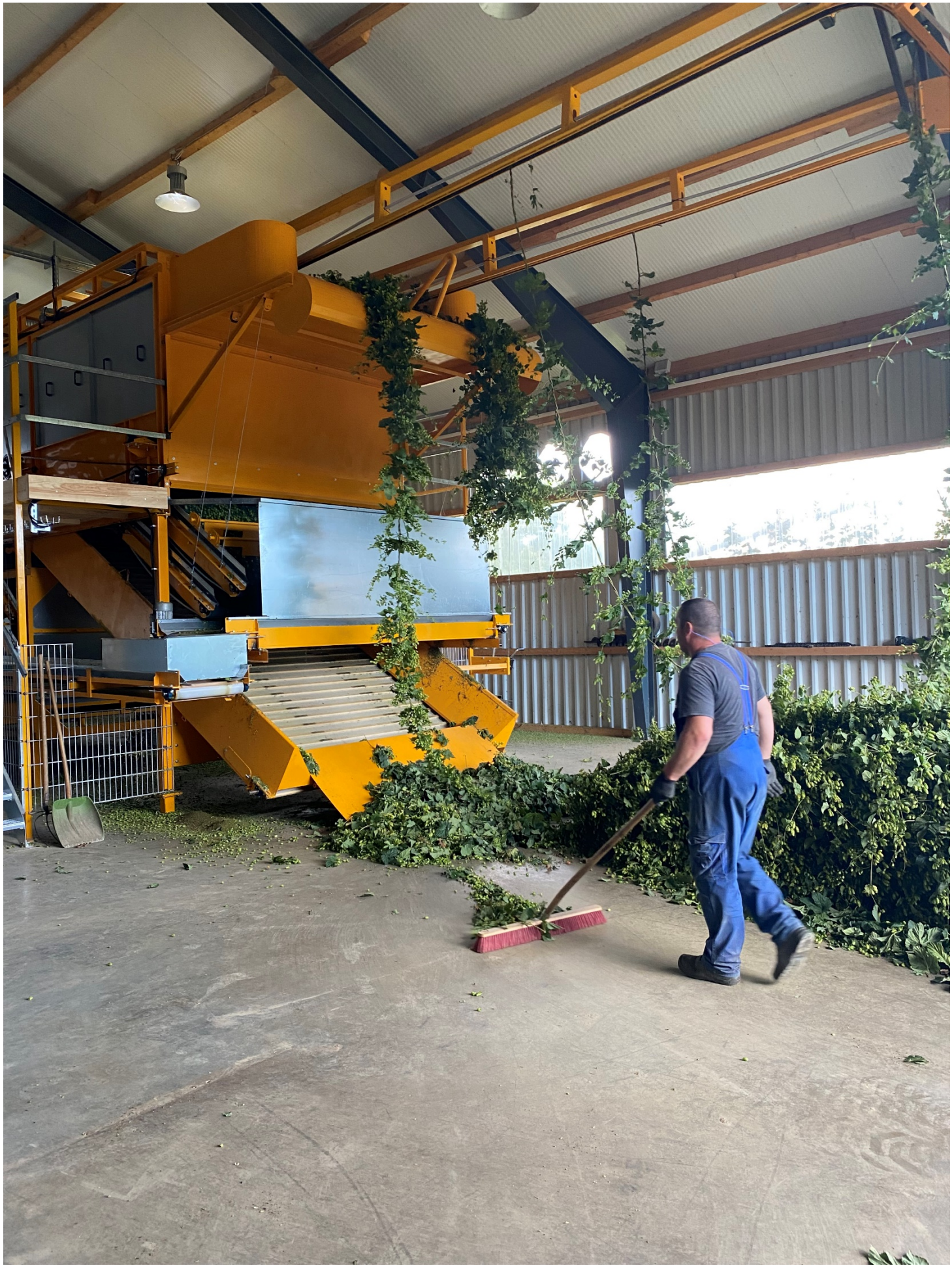
Pest Mitigation: bird netting recommended, pest mitigation if not already in place.
Ground Contact: the design of the Wolf and Fuss pickers puts the attachment point at a very low level. This is designed so that workers can pick bines off the ground and attach at about chest level. To move bines from truck to picker, a redesign of all pickers would be needed. Since the current equipment design results in substantial floor contact, it is essential that floors should be kept clean of oil and other potential contaminants.
Smoking: enforcement of non-smoking policies, especially in areas around pickers.
Cold Storage: HQG recognizes the burden that installing this infrastructure would pose to small farmers. However, time sensitive storage of bales is paramount to our members and viewed as critical to flavor and aroma of hop quality. We would like to emphasize this recommendation as top priority.
Safety: upgrades to protective caging so that belts are easily accessed when needed, but closed when not needed.

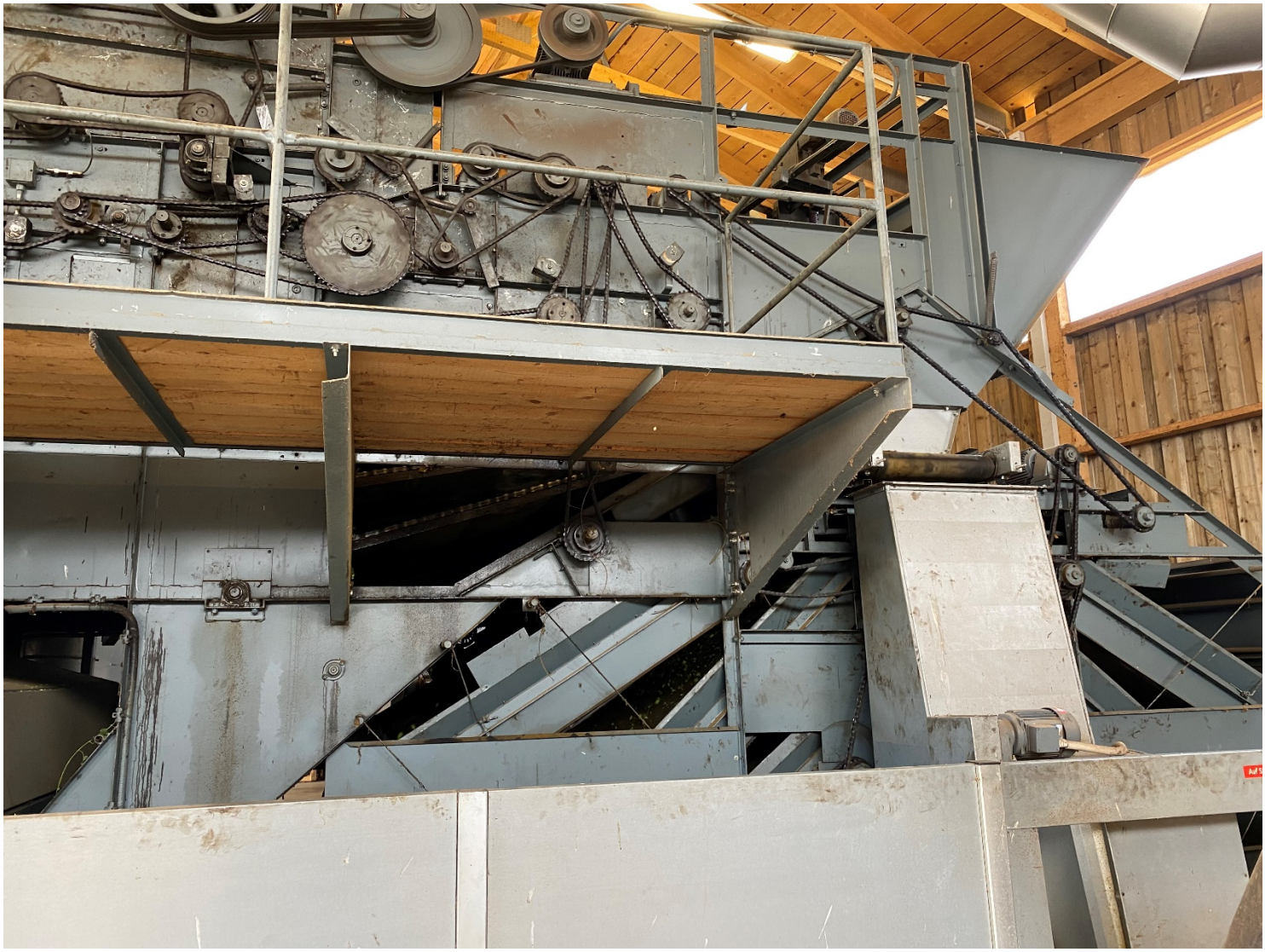
Additional Comments:

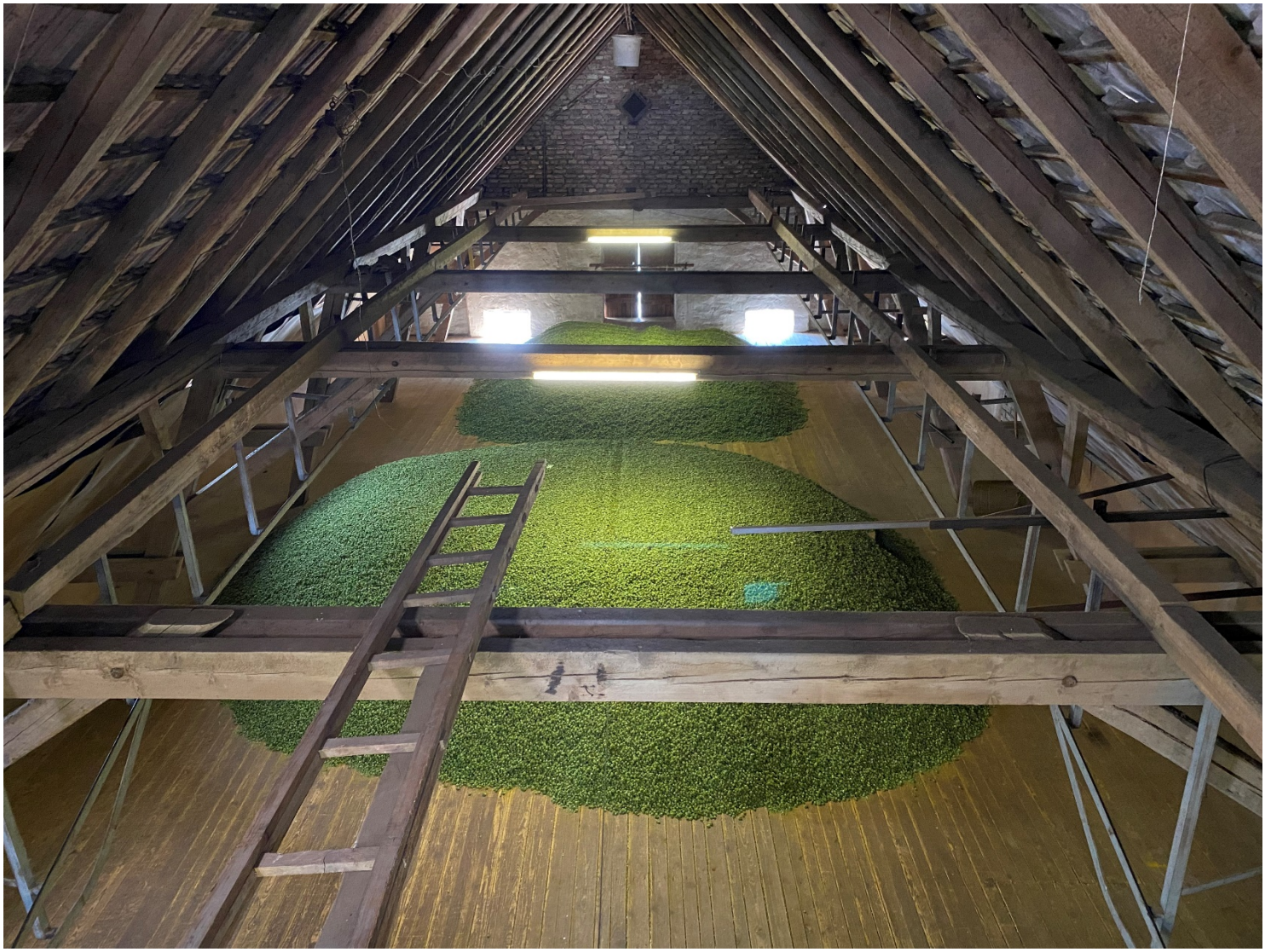
What certifications does the grower possess, if any?

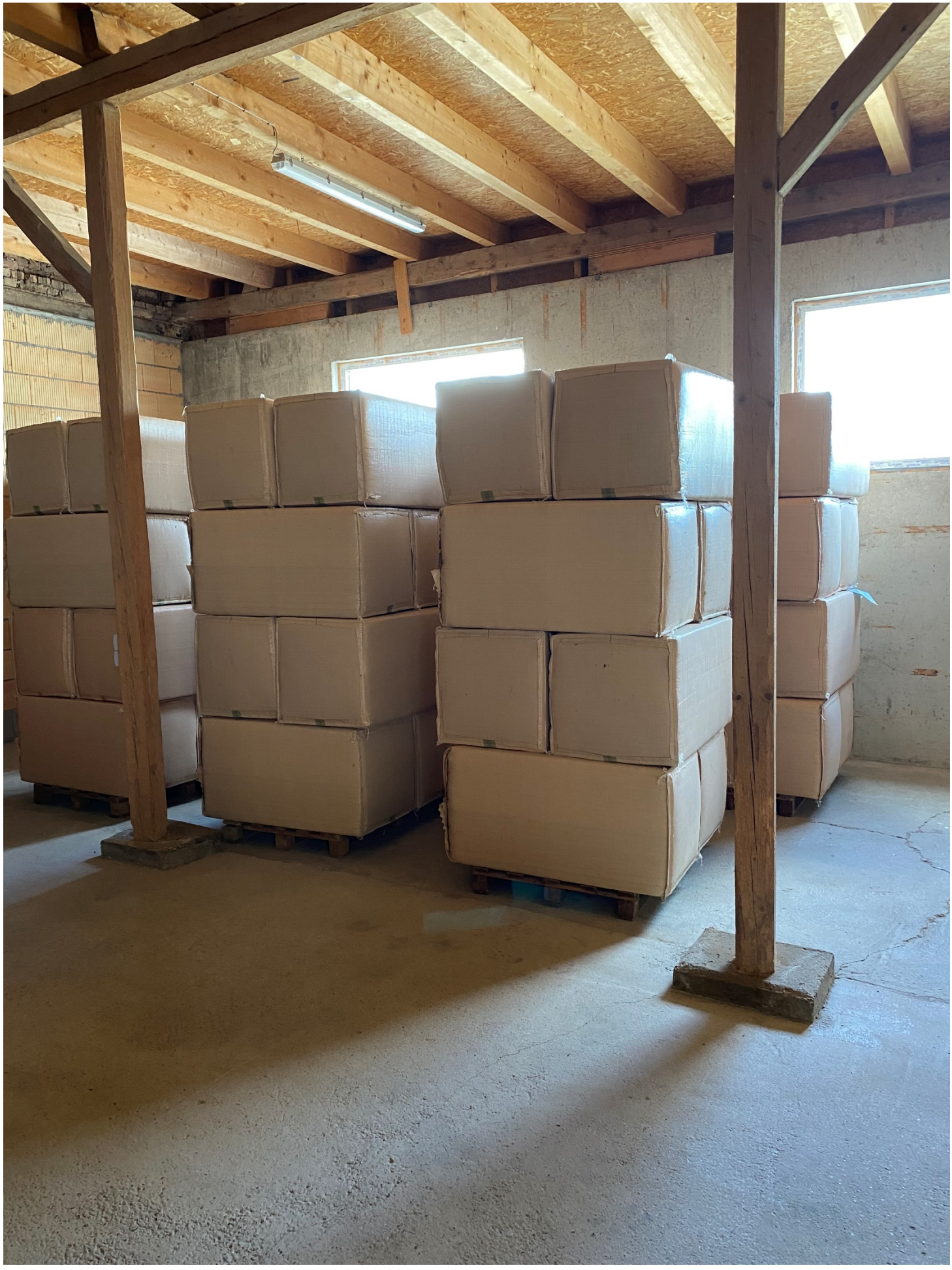
- All farms are part of the Common Agricultural Policy.
- All farms must be registered.
- Certificate of Compliance in Plant Protection is required to purchase or apply sprays.











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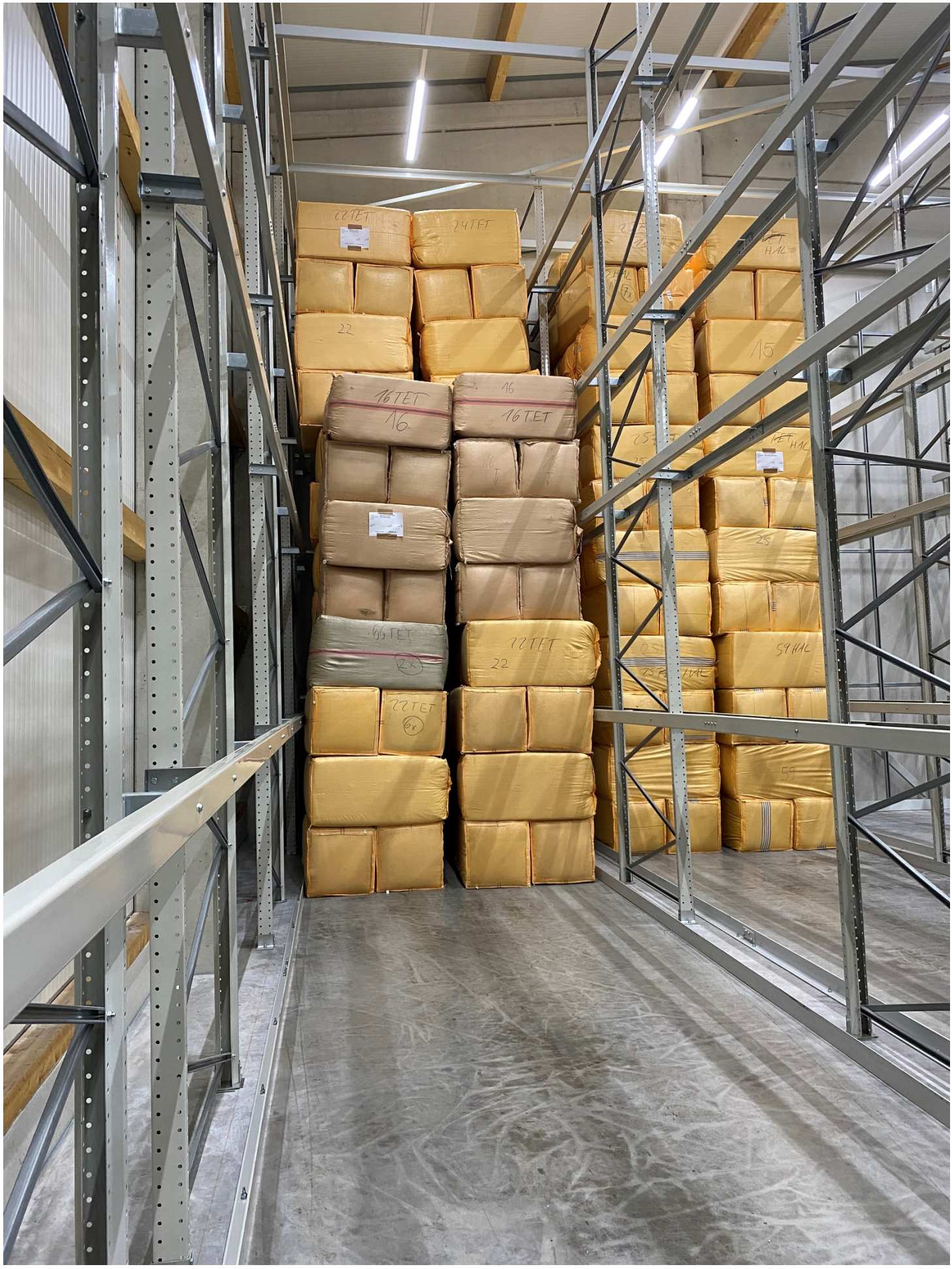
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