



HAARSLEV™

Processing Technology



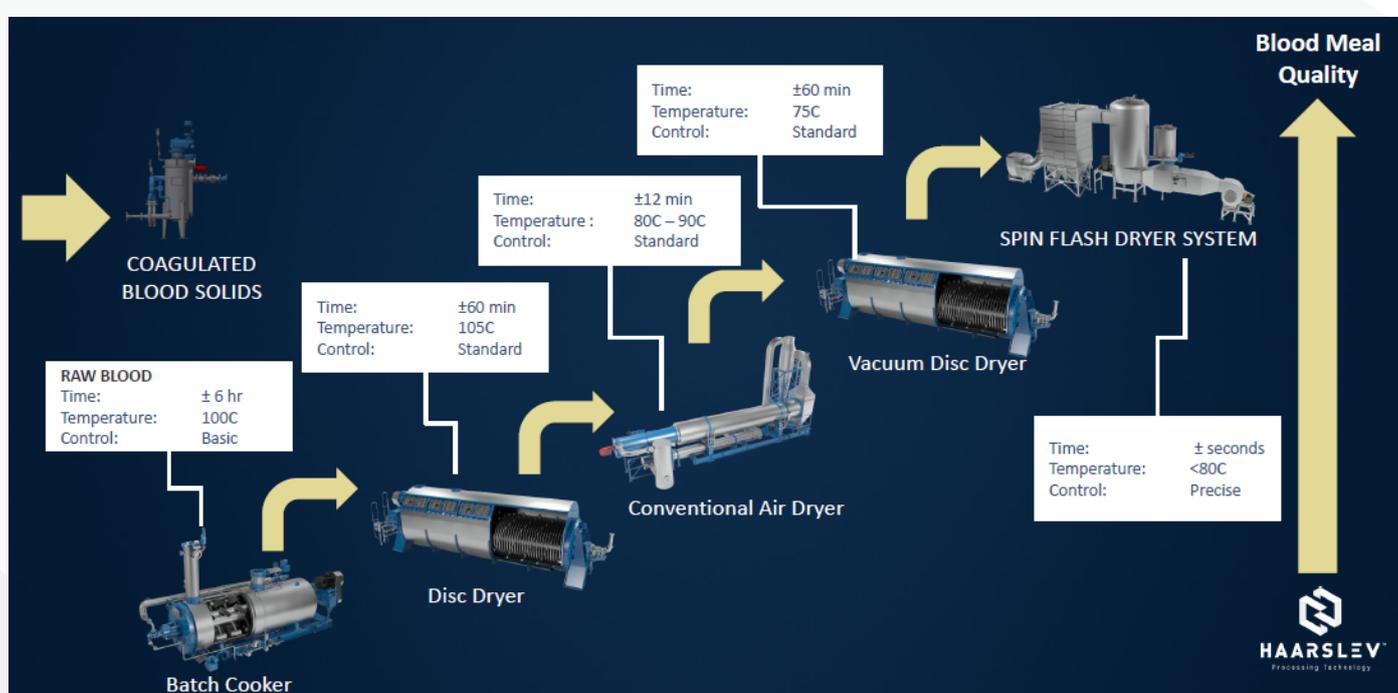
**INCREASING THE VALUE
OF BLOOD PROTEIN**

WHY PROCESS BLOOD?

“Blood meal is an underestimated feed ingredient of high protein content with essential amino acids.”

PROCESS HIERARCHY DRIVING PROTEIN QUALITY MOVING UP THE VALUE CHAIN

The drying process has a pivotal impact on the blood meal quality



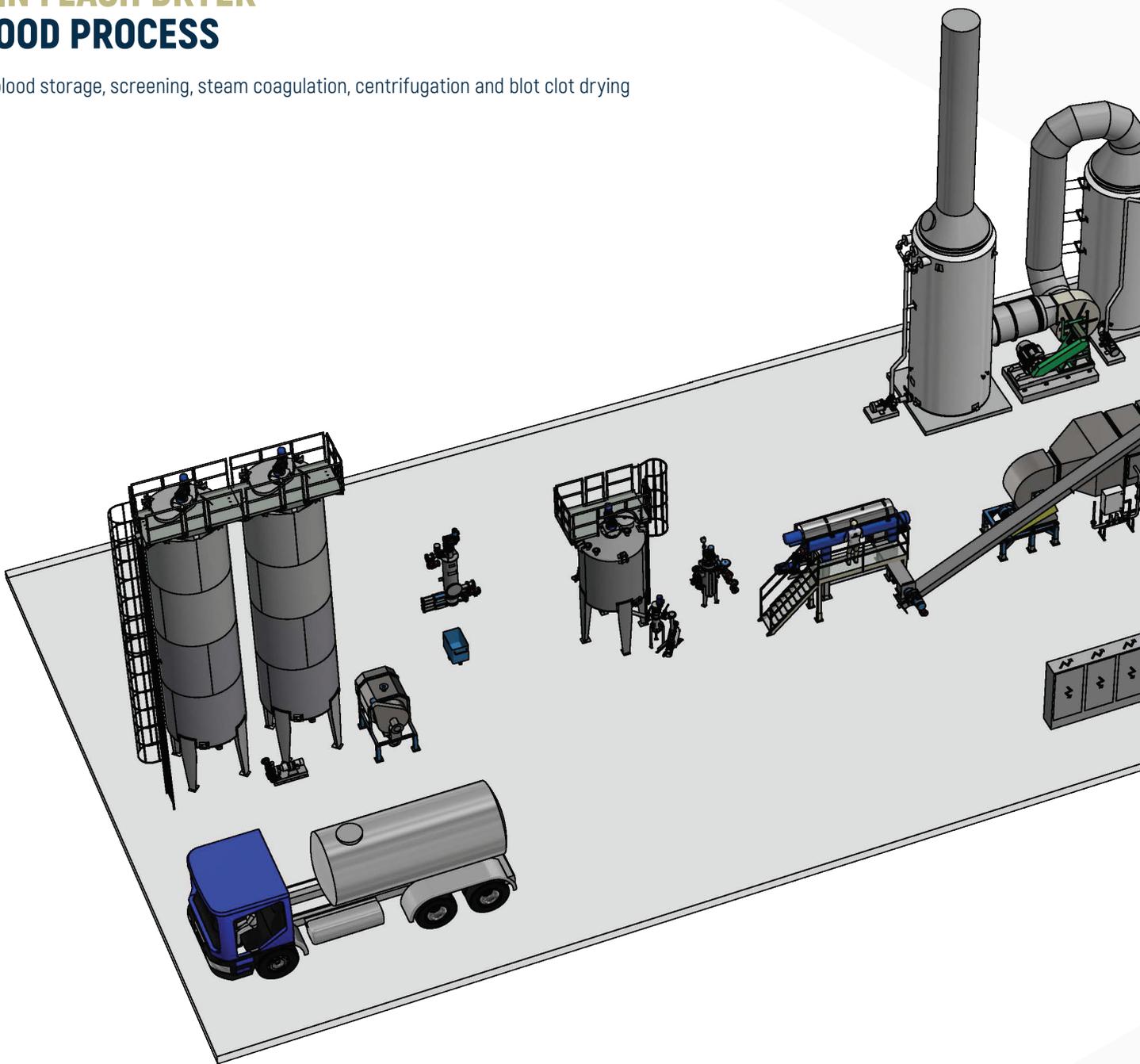
TECHNICAL FEATURES OF THE SPIN FLASH DRYER

- Extremely short residence time (few seconds)
- Simultaneous instant drying and grinding (no need of additional milling step)
- No need of a cooling step (finished product is already cooled down (low temperature pick up from the drying process)
- No need of heavy sieving (just safety sieving)
- Microbiological contamination is mitigated (no dead zones or product holdup) / easy sanitization
- Small footprint
- Easy maintenance
- Operational flexibility / very easy to operate (start / stop)
- Patented IDX technology with licenses available to the industry

IDX is a patent-protected technology and a registered trademark of Tessenlerlo Group NV

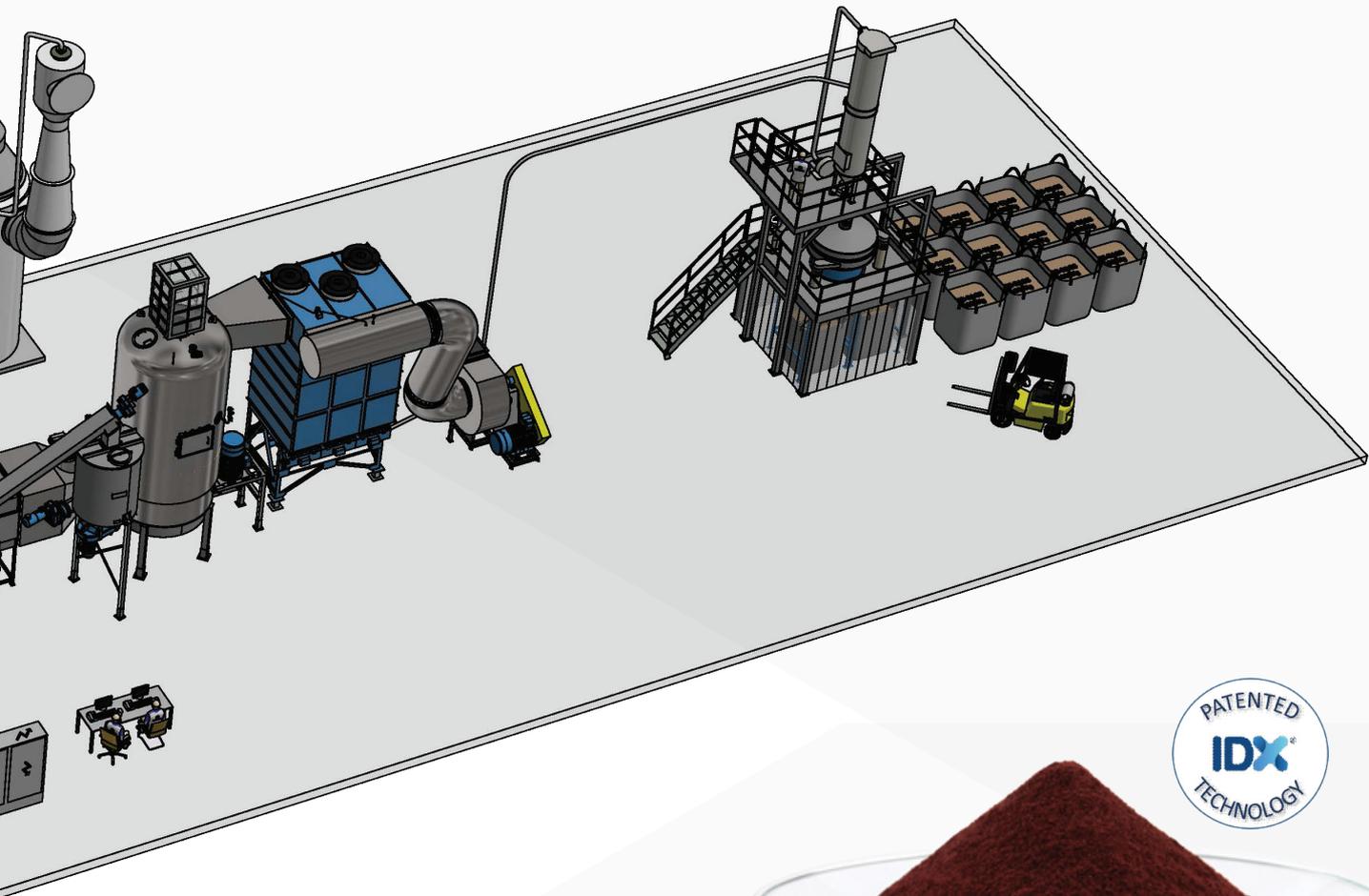
SPIN FLASH DRYER BLOOD PROCESS

Raw blood storage, screening, steam coagulation, centrifugation and blot clot drying



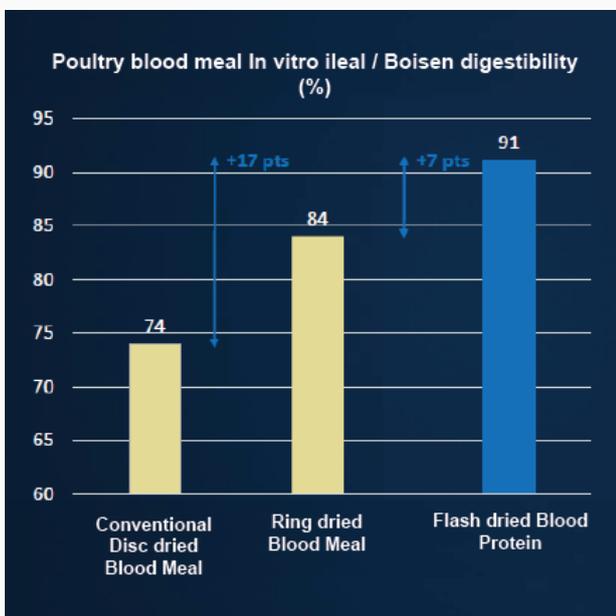
BLOOD CHARACTERISTICS

- Typically, animal blood constitutes between 3-5% of slaughter live weight
- Pure animal blood contains up to 18% Dry Substance (DS). Typically, blood collected and delivered to a rendering facility is partially diluted with water and contains circa 8-15% DS.
- Blood is either sanitary collected for food grade production (pork & bovine) or it is collected for feed purpose
- Blood meal is a valuable feed ingredient due to its high protein content (> 90%) and high digestibility when dried with the appropriate process
- Raw blood is a very challenging product to handle, process or dispose of. To prevent its quick deterioration we recommend to store raw blood in refrigerated storage tanks if it is not processed immediately after collection
- In many countries specialized companies collect blood from regional slaughterhouses to bring to a central plant for processing



PRODUCT FEATURES

- +90% Boisen digestibility
- Homogeneous small particle size distribution facilitates the formulation and adds functionality in the extrusion process
- Bright red color of the blood meal
- Less end product variability

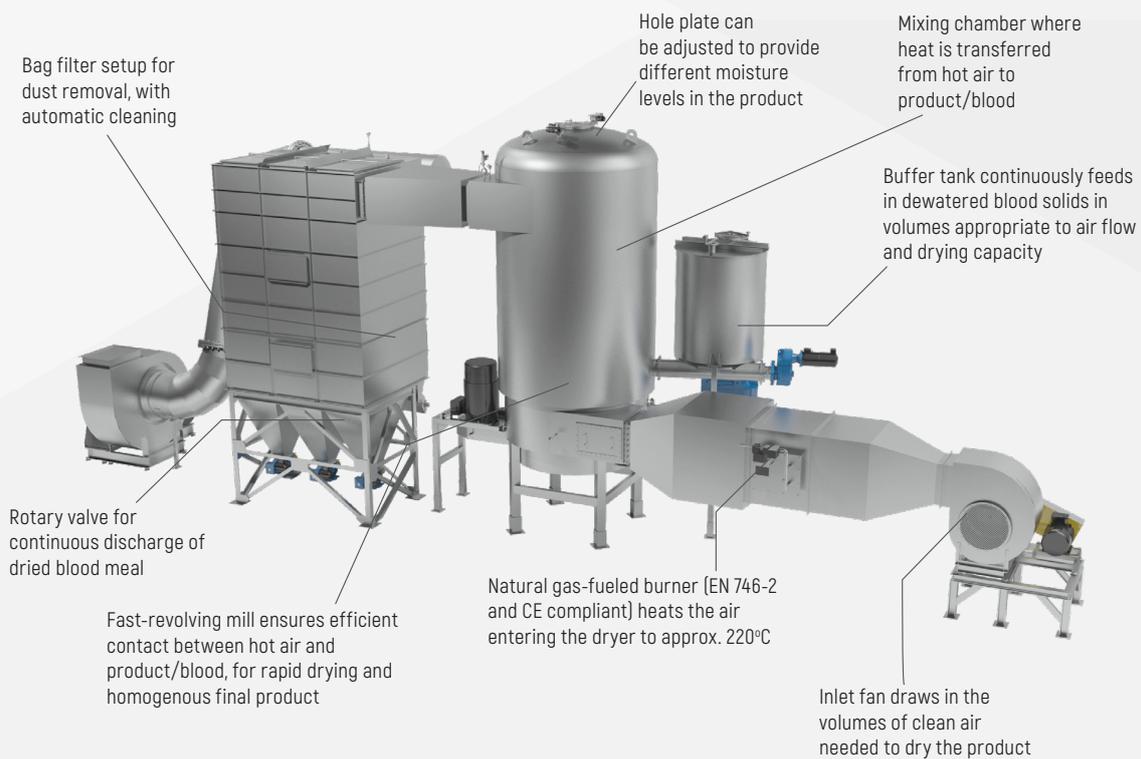


Flash dried poultry blood meal has 17% higher ileal/Boisen digestibility compared to conventional disc dried blood meal, and 7% higher than ring dried blood meal.

ABOUT HAARSLEV

- Over 100 years of experience, around the globe, in by-product processing with ~900 employees
- The global leader in designing, manufacturing, installing and servicing state-of-the-art process solutions for processing valuable by-products
- Strong legacy in meat & poultry rendering and fish by-product processing
- Present on all continents with multiple global production sites, 17 sales and service offices and over 40 agents worldwide
- More than 80.000 m2 combined production area

COAGULATED BLOOD THAT HAS PASSED THROUGH A DECANTER CENTRIFUGE

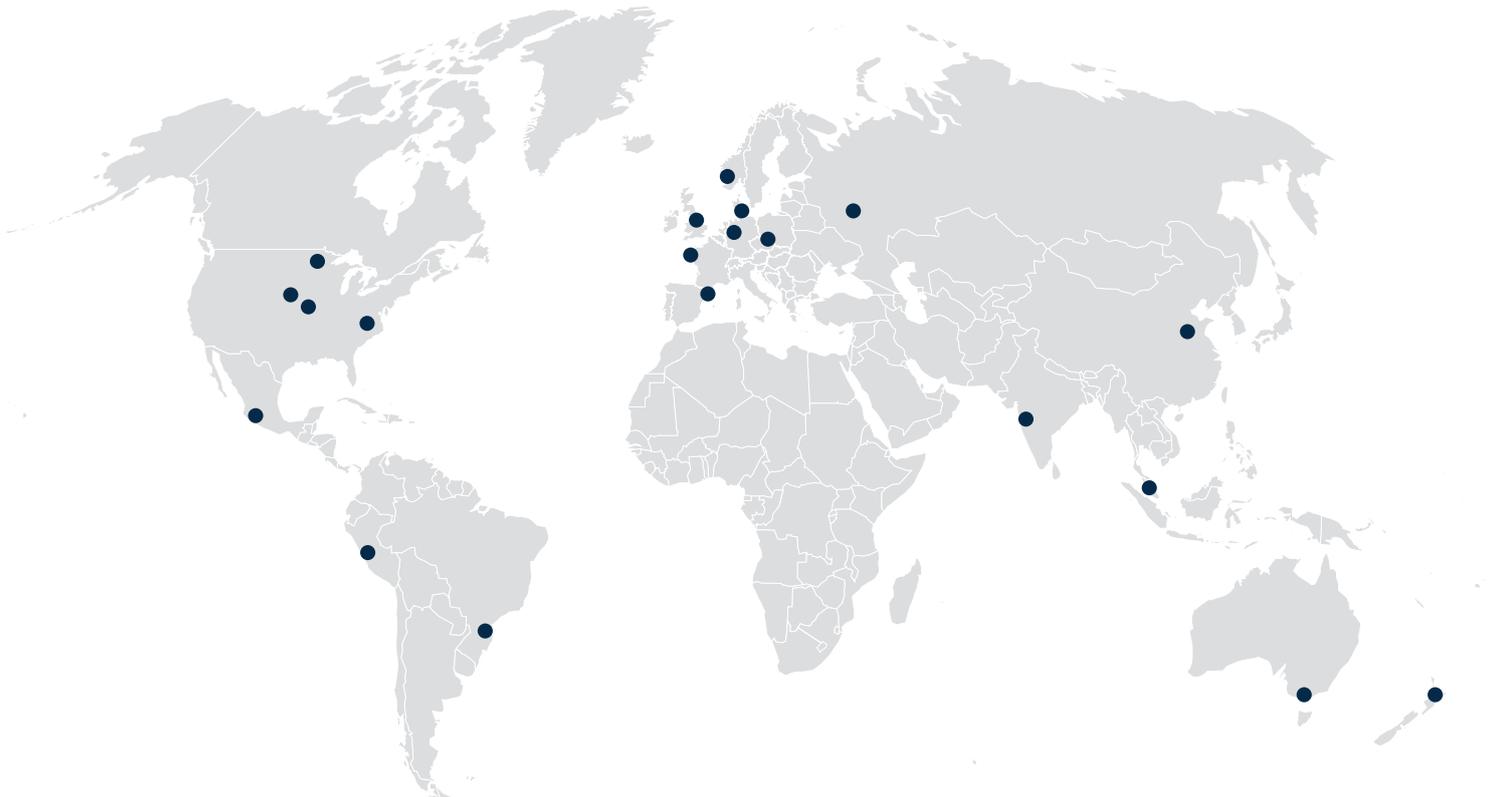


BLOOD MEAL STORAGE SILO, OR OTHER PACKAGING/STORAGE FACILITIES



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TAKING CARE OF TOMORROW

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