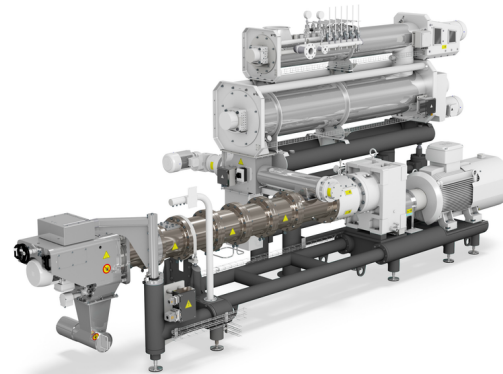


Aquafeed extrusion

Borregaard natural binders in aquafeed



Rainbow trout, grower feed 5mm

35% Protein - 15% Fat

Parameter	Value	Value
	without Lignobond DD	with 3% Lignobond DD
Throughput/Extruder (Kg/hr)	367.2	369
SME/Extruder (MWh/TN)	37.7	36.9
Pressure/Endplate (bar)	26.1	23.2
Temperature/Endplate (oC)	114	113
Durability Holmen (PDI) (%)	95.6	99.1
Humidity (%)	9.6	8.1
Water Activity	0.539	0.480

Conclusions

- Throughput increase
- Decrease of energy consumption (MWh/TN)
- Decrease of steam pressure
- Increase durability
- Higher humidity
- Lower water activity
- Lower steam pressure means more steam absorption

Intact aqua application for shrimp feed and fingerling hatchery feed

- Control: synthetic binder
- Intact aqua (0,5%)
 - Increased throughput (29%)
 - Energy savings (29%)
 - No compromise on PDI, water stability or fines
- Intact aqua (0,3%)
 - Increased throughput (2,5%)
 - Energy savings (9%)
 - Fines reduction (7%)
 - No compromise on PDI or water stability

