

ARMO ROTMOULDING CONFERENCE

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***AN INDEPENDENT VIEW OF NEW HIGH RATE
PULVERISER TECHNOLOGY***

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BACKGROUND

- “Airforce” technology for pulverisers
- Developed by Orenda Automation
- Patents now registered
- Rotomotive called in to conduct independent trials
- Consultant’s Report available from Orenda
- North American launch at ROTOPLAS ‘14
- European launch at ARMO ‘15



CLAIMS FOR “AIRFORCE”

Parameter	Effect	Amount
Production Rate	↑↑↑	60%
Energy Use	↓↓	40%
Typical Temp SP(°C)	↑↑↑	70→100
Material Capability	!!!!	?????

HOW A PULVERISER WORKS

- Pellets fed into space between two serrated discs
- One disc is fixed, one disc is rotating (at high speed)
- Discs are contained within a flat cylindrical chamber
- Particle size is progressively reduced as material passes between discs
- Air flow, produced from a fan, transports material out of the chamber

HOW A PULVERISER WORKS

- For PE, size reduction is a combination of two actions: **CUTTING** and **TEARING**
- **Heat (in large amounts) is generated by the tearing action, generating “tails”**
- **“Tails” obstruct powder flow in rotomoulding**
- **We need the heat to shrivel the “tails” and prevent poor flow**
- **The softer the PE grade, the more tearing, so the more heat is generated**

HOW A PULVERISER WORKS

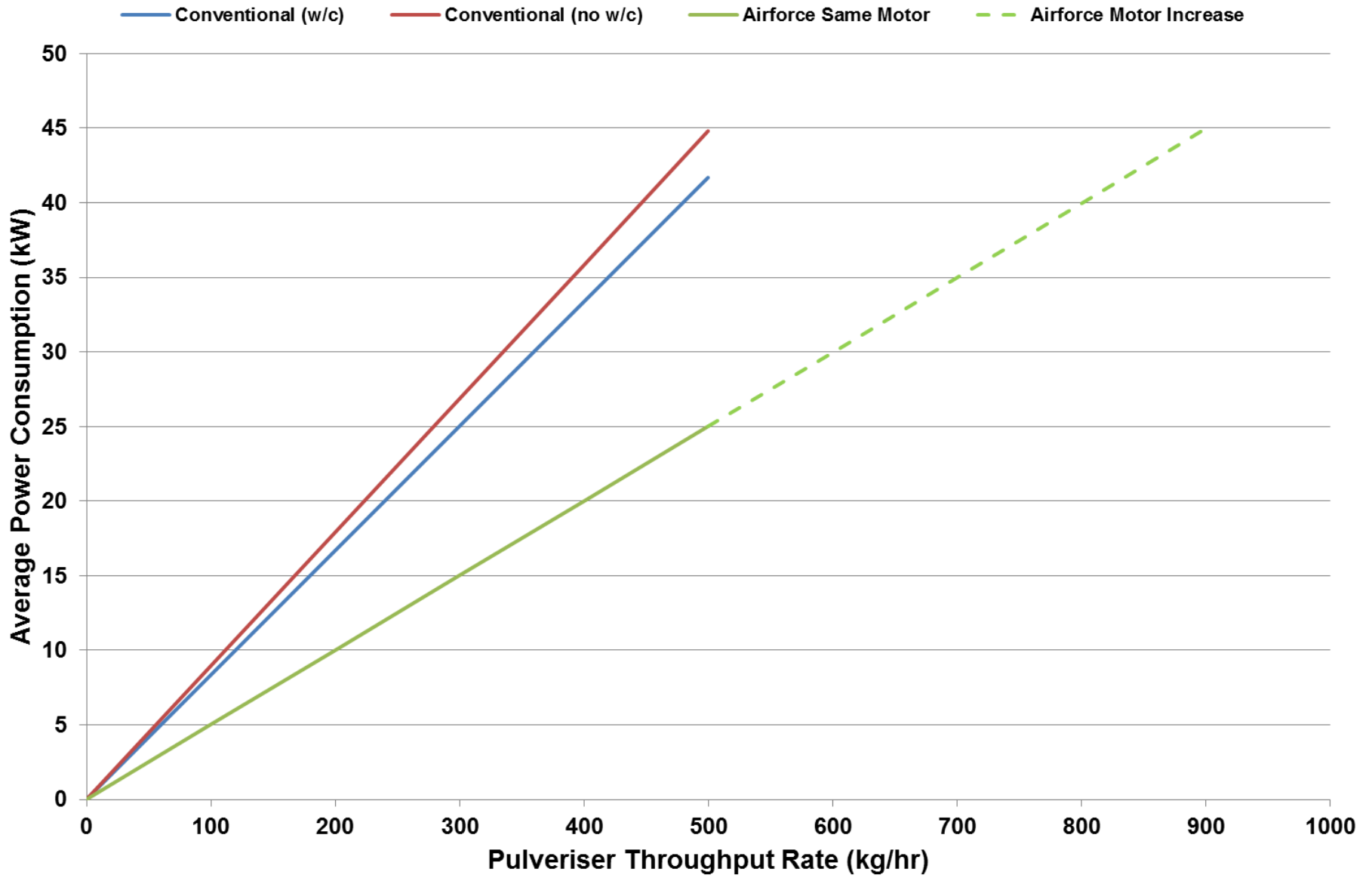
- For acceptable powder quality, temperature must be maintained as high as possible
- **However: too much heat will create a MELTDOWN in the mill chamber**
- Meltdowns stop powder flow through system, necessitating mill shutdown for cleaning
- **Operators try to prevent meltdowns by reducing mill temperature**
- Reduced mill temperature produces unacceptable powder quality

HOW A PULVERISER WORKS

- **Pulveriser control system monitors mill temperature**
- **If temperature > set point, feed slows down**
- **If temperature < set point, feed speeds up**
- **System response often too slow to deal with temperature excursions & meltdown occurs**
- **Motor running rotating disc is subjected to major fluctuations in demand: inefficient**
- **Water cooling (top disc) helps (marginally)**

“AIRFORCE” SYSTEM

- Innovative air distribution system cools BOTH disks evenly
- MUCH higher SP temperatures are possible: 100°C vs. 65-70°C for conventional systems
- Plate & mill chamber temperatures are steady, so feed variation is eliminated
- Much more efficient use of mill motor capacity
- Powder quality much less variable
- Quicker start-ups / less off-spec produced



CONCLUSIONS / IMPLICATIONS

- **“Airforce” is a game-changer**
- **The cost of producing powder can reduce**
- **MUCH more stable process / less meltdowns**
- **Better powder quality because operators will maintain high temperatures**
- **In-house grinding becomes an easier choice for rotomoulders**
- **Easier to grind PP at ambient conditions?**