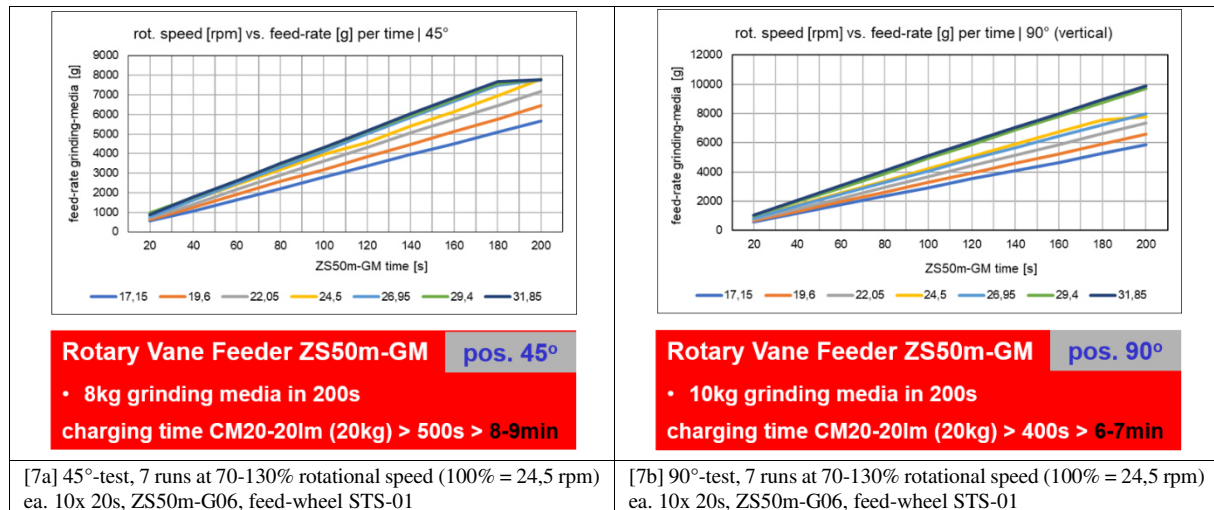


Rotary Vane Feeder ZS50m-GM06 pilot results of single trap surface (STS) feed-wheel at grinding media transfer

140 measures during 14 runs with 2 new STS-wheels in 2 transfer positions (45° and 90°) have been carried out. Each measure was taken after 20s, thus the total run-time was 1.400s/wheel equals to 23min20s, total test-time 46min40s. Rotational speed of the feed-wheel was varied from nominal 100% (24,5rpm) to 70, 80, 90, 110, 120 and 130% for each transfer position. Total transferred grinding media was 105,494kg equals to 239.759 steel balls.



Best results with respect to transfer load are achieved at 90° transfer position [7b], all 7 curves/lines are higher than the corresponding ones at 45° transfer position. The feed-rate is increasing with the rotational speed of the STS-wheel increasing.

	transfer position	Σ time [s]	Σ transfer [kg]	feed-rate [kg/h]	feed-rate [Δ-%]	feed-rate max. [kg/h]	feed-rate max. [Δ-%]	runs	data obtained	% N-speed deviation	
a	45°	1.400	50,382	129,554	+/-0	139,806	+/-0	7	ea. 20s	70-130%	
b	90°	1.400	55,112	141,717	+9,14	178,002	+27,32 ^{x1}	7	ea. 20s	70-130%	
Σ	a+b	2.800	105,494	135,635	-	14	14	14	-	-	
T2, mass transfer, feed-rate average and max.							^{x1} > see mismatch M02				

Due to mismatches M01-M04, the general increase 45° to 90° can only be estimated. With regard to the total transferred mass in both angels (50,382kg vs. 55,112kg), it should be higher than (+9,14%) and lower than the measured max. value of (+27,32%). In any case it is significant, feeding angel, which describes particularly the flow-in angel at ZSm is to be recognized [T2].

M	mismatch	% N-speed [%]	speed [rpm]	curve	time	
01	45°	120	29,40	green	180s ff.	significant change of slope (-)
02	45°	130	31,85	black	180s ff.	significant change of slope (-)
03	90°	100	24,50	orange	180s ff.	significant change of slope (-)
04	90°	110	26,95	blue	all	blue lower than orange, should be vice versa
T3, mismatches with respect to [1a] and [1b]						

Even the working/transfer volume of STS-wheels is comparably small, the transfer capacity is impressive where at present status commercial success can only be predicted since strength and stability of the filament-printed structure is not at all acceptable for commercialization. However, weak material in this case is resulting in wear and damage determining lifetime but geometry is determining performance. STS-wheel-speed and transfer position are determining performance, too and should be further investigated, highest applied 130% of nominal speed at 90°-position seems not to be the limit. However, achieved transfer-performance parameters are more than good enough for commercialization.