

ALEMO developments in the field of the foam extrusion machinery for further CO₂ and product cost reduction

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ALEMO
R&D

Reduction of
raw materials

Lines general efficiency

Reduction
of energy consumption





ALEMO technologies

VS

Other
technologies

1lb
foam

=

-0.8lb

CO₂

For every 1 pound of foam produced on ALEMO extruders,
the CO2 footprint is reduced for 0.8 pound
if compared with similar production on other machinery.



ALEMO technologies

VS

Other
technologies

Annual production of CO2 in metric tons at 3 metric Kt of PE raw material consumption

Alema technology raw material content – g/m2	11	14,4	15,5	11	17,5	100	120	411,8	
iso-butan consumption – %	22	22,5	22	21	20	18	17,6	16,2	
Alema technology total scrap production – % (incl. side stream)	14	12	8	8	5	4	3	3	
internally regriped PE used – %	0	15	15	30	30	30	30	30	
Alema technology total (incl - regriped) scrap production – %	14	-8	-7	-22	-25	-26	-27	-27	
Alema technology total scrap production – g/m2	1,5	1,5	1,2	2,5	3,9	6,4	9,6	13,0	
Alema technology total (incl - regriped) scrap production – g/m2	1,5	-0,4	-1,1	-6,8	-13,4	-41,6	-46,4	-116,6	
Alema technology total virgin raw material consumption – g/m2	12,5	12,0	14,4	24,2	58,1	118,4	233,6	315,2	
Alema technology total iso-butan consumption – g/m2	2,8	3,1	3,7	7,0	16,3	30,0	58,0	72,3	
Alema technology electrical energy consumption – kWh	3,2	1,1	1	0,9	0,8	0,8	0,8	0,8	
Recycling process total energy consumption – kWh	3	3	3	3	3	3	3	3	
Alema technology total electrical energy consumption – kWh	15,0	22,9	26,0	66,4	153,5	155,5	628,5	848,1	
CO2 equivalent grams per gram of raw material – g/g	2,5								
CO2 equivalent per gram of iso-butan g/g	3								
CO2 equivalent grams per KJ of EE – g/KJ	0,05								
Alema technology equivalent CO2 grams per m2 of product – g/m2	40,4	40,6	48,4	84,9	201,8	401,8	789,5	1046,6	
PROTECTIVE PE FOAM thickness - mm	0,5	0,8	1	2	5	10	20	25,4	
product density	30	20	20	18	18	18	18	20	
Normal technology raw material content – g/m2	15	16	20	36	100	180	360	548	
iso-butan consumption – %	17	19	18	18	18	18	18	13,6	
Normal technology total scrap production – % (incl. side stream)	18	13	10	10	6	6	4	4	
internally regriped PE used – %	0	0	0	15	25	25	25	25	
Normal technology total (incl - regriped) scrap production – %	18	13	10	-6	-19	-19	-21	-21	
Normal technology total scrap production – g/m2	2,7	2,1	2,0	3,6	5,4	10,8	14,4	20,3	
Normal technology total (incl - regriped) scrap production – g/m2	2,7	2,1	2,0	-1,8	-17,1	-14,2	-15,6	-106,7	
Normal technology total raw material consumption – g/m2	17,7	18,08	22	34,2	72,9	145,8	284,4	401,32	
Normal technology total iso-butan consumption	3,0	3,3	3,9	7,3	17,2	27,5	52,0	75,9	
Normal technology electrical energy consumption – kWh	3,7	1,6	1,5	1,3	1,2	1,2	1,2	1,2	
Recycling process total energy consumption – kWh	3	3	3	3	3	3	3	3	
Normal technology total electrical energy consumption – kWh	30,3	28,9	33,0	74,7	205,0	418,0	847,3	1167,4	
CO2 equivalent grams per gram of raw material – g/g	2,5								
CO2 equivalent per gram of iso-butan – g/g	3								
CO2 equivalent grams per KJ of EE – g/KJ	0,05								
Normal technology equivalent CO2 grams per m2 of product – g/m2	54,8	56,6	68,4	110,6	244,2	467,8	908,5	1277,2	
CO2 saving by using Alema technology – g/m2	14,4	16,0	20,0	25,8	42,4	66,2	119,0	230,6	
factory using ALIMO	387.130 - 3.000				387.165 - 3.600				
assumed total annual production – K m2	15000	25000	25000	10000	2000	6000	4000	500	
total raw material consumption – Tons (metric tons)	188	301	360	242	116	710	134	158	3089
total scrap production	23	37	31	25	8	38	28	6	201
total scrap minus regriped	23	-6	-27	-68	-39	-250	-146	-58	-716
Total annual CO2 saving – Tons (metric tons)	216	401	500	258	85	397	476	115	
TOTAL annual FACTORY CO2 SAVINGS – Tons (metric tons)	2449								
Good factory processing 149 Tons of virgin raw materials, with Alema machines saves 254 Tons (metric tons) of CO2 if compared with good factory using other machines, and producing the same amount of products, with the same operational characteristics.									
ALIMO Total annual CO2 production – Tons (metric tons)	806	1015	1210	849	404	2410	1158	529	10173
Normal technology Total annual CO2 production – Tons (metric tons)	822	1416	1710	1106	488	2807	3634	639	12821
									100%

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How are big savings
achieved ?

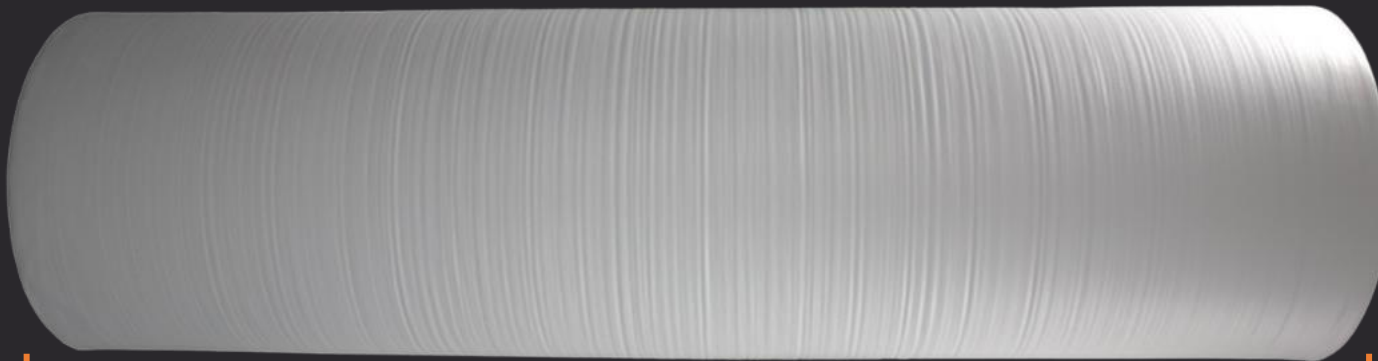


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- Machine around optimal process
- Line stability – lighter, lower density, small cell foam of sufficient mechanical characteristics



126 "

ALEMO
technologies

0.00225 lb/ft² at 0.02" thickness



How are big savings
achieved ?





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How are big savings
achieved?

- Lower energy consumption as a result of tailored machine around the process
- Low energy consumption components



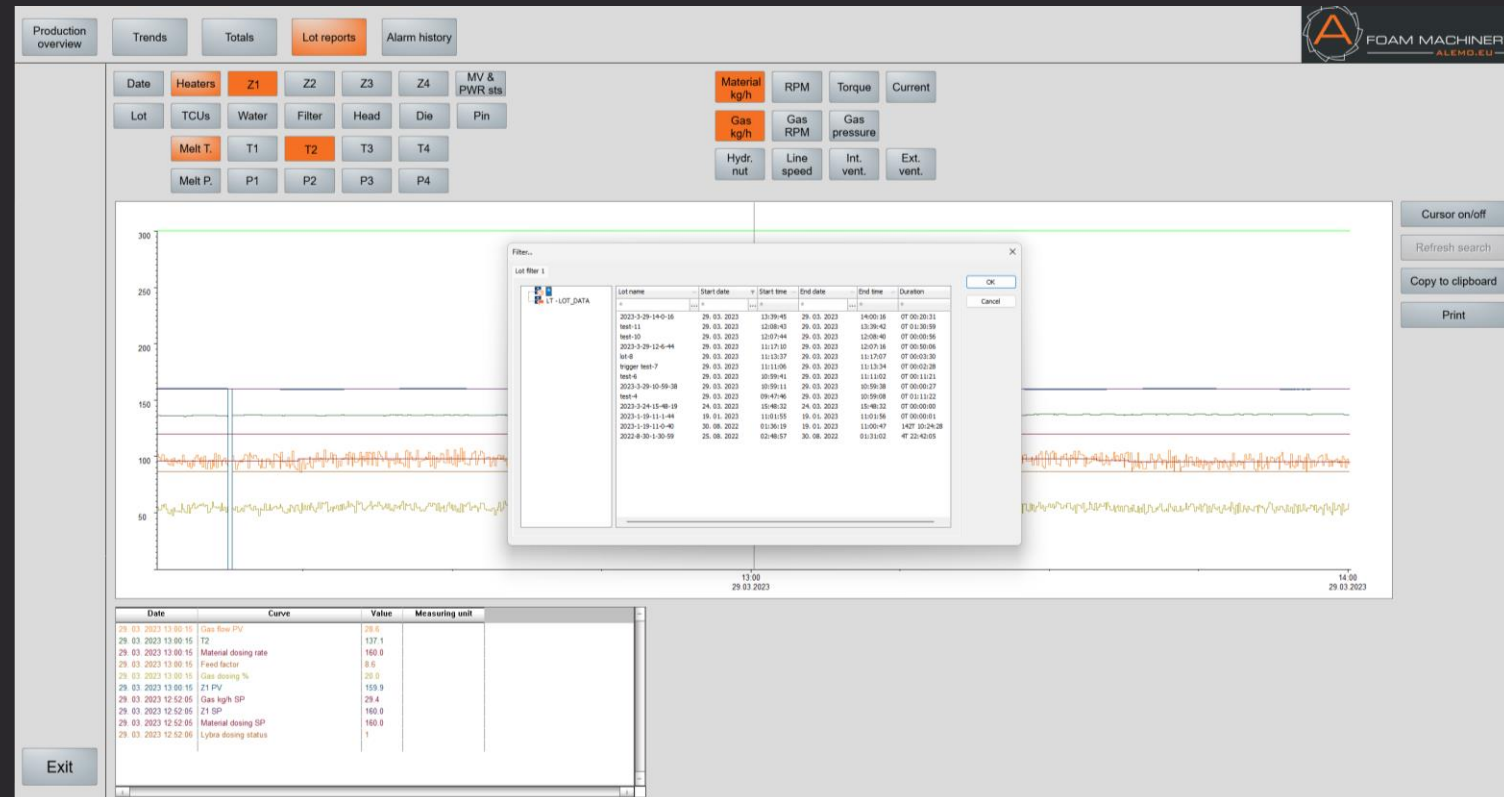


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How are big savings achieved ?

→ Foam Track, Software developed by ALEMO allows overview of all the parameters involved





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How are big savings achieved ?

- Extrusion of thin foam widths from 116" – 126" - using one die only – less scrap
- 0.02" thick EPE foam at 0.00225 lb/ft² made by ALEMO extruder has 100% better compression in comparison to standard 0.04" thick EPE foam at 0.00328 lb/ft²





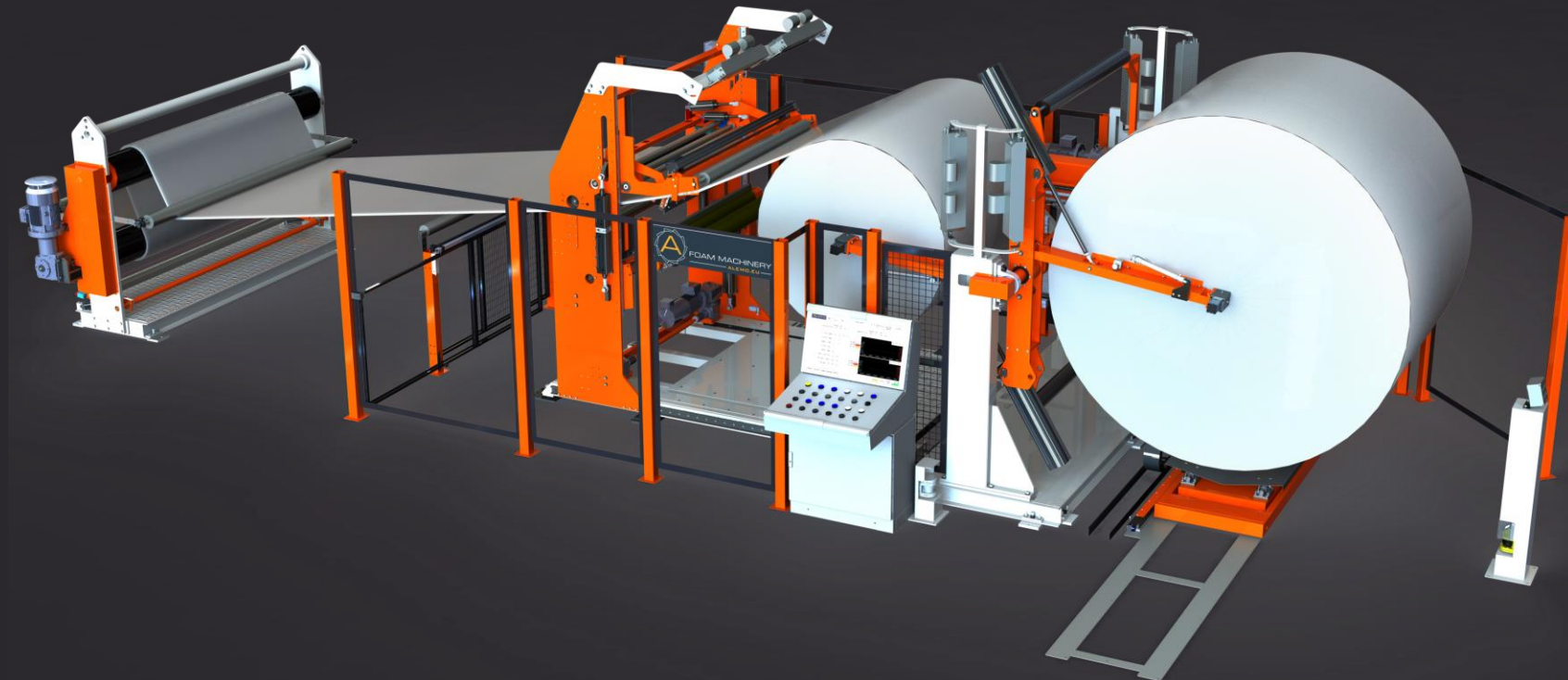
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How are big savings
achieved ?

→ Automatic winder for rolls up to 98" diameter, including automatic rolls change and unwinding for tension release, involve less scrap in material transformation.

98"





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How are big savings
achieved?

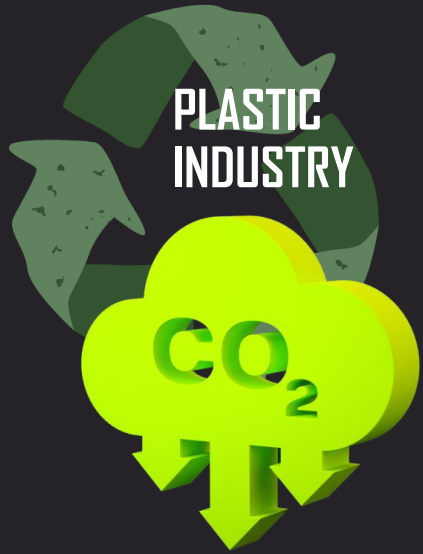
→ Out of calculations in-line foam transformation for further reduction of CO₂

→ **ALEMO masters the process and never stops improving!**



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Reduction of
raw materials

Use of recycled material

Reduction
of energy consumption



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Thank you!

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