



...engineering is our passion; green is our mission...

NEW ENGITEC HAMMER MILL HEAVY DUTY SERIES

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- 1) FEW WORDS ABOUT ENGITEC
- 2) METAL SCRAP; THE BANK OF ENERGY
- 3) THE CONCEPT OF END OF LIFE
- 4) INCREASING THE PROFIT
- 5) ENGITEC RETROFIT FOR PROCESSING 100% ULAB
INDUSTRIAL BATTERIES
- 6) CONCLUSIONS



...A SHORT SUMMARY OF ENGITEC HISTORY – CX[®] PLANTS FOR BATTERIES



...A SHORT SUMMARY OF ENGITEC HISTORY – CX® PLANTS FOR BATTERIES

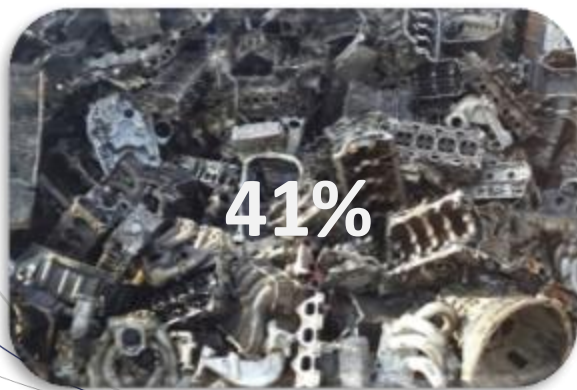
		North America	Central America	South America	Europe	Africa	Middle East	Russia & CIS	India	China	South East Asia	Oceania	TOTAL
Cosmo	40,0tph	1	1										2
	30,0tph	3	1	1	2								7
Global	25,0tph						1						1
	20,0tph	2			7				8				17
	16,0tph				2								2
Export	15,0tph							1					1
	10,0tph				4	1	1	2					8
	8,0tph					1							1
	6,0tph				2	2	3			2	1		10
Regional	5,0tph		1		7		4						12
	3,0tph		1	1	3	2	2		1				10
	1,5tph				1								1
	Other Plant (and/or individual major machinery)	1	1		10	1	1	1					15
	Upgrading/Revamping	1	2		3								6
	TOTAL	8	7	2	40	4	4	12	4	9	2	1	93

METAL SCRAP; THE BANK OF ENERGY

Primary Al Production in 2023:
70,500,000 T ^[1]



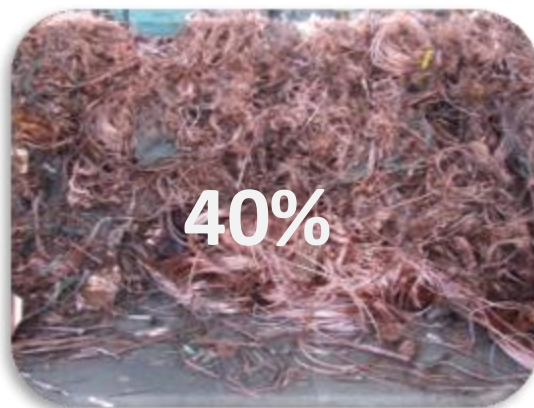
Trading of Al Scrap in 2023:
≈ 29,400,000 T ^[2]



Primary Cu Production in 2023:
23,000,000 T ^[3]



Trading of Cu Scrap in 2023:
≈ 9,200,000 T ^[4]



Primary Steel Production in 2023: 1,900,000,000 T ^[5]



Trading of Steel Scrap in 2023:
≈ 665,000,000 T ^[6]



METAL SCRAP; THE BANK OF ENERGY

- In 2023, approximately 4.5 million metric tons ^[7] of lead was extracted from mines worldwide.
- Lead is used in building construction, lead-acid batteries [82%], fusible alloys, and as a radiation shield, among other uses, wrapping of cables.
- In **2022**, according to ILSZG (The Lead Factbook) production of secondary lead was **approximately 8,3 million metric tons** ^[8].
- Therefore, we can assume that production of secondary lead is two times the production of primary. It is very different from the data of other metals. **WHY???**

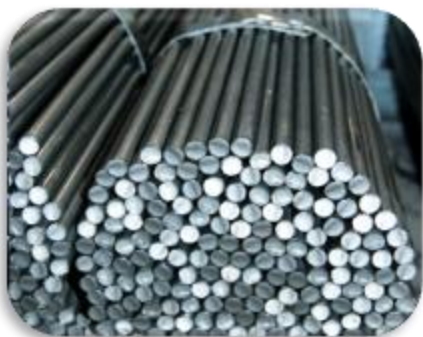


*From ULAB to Lead Ingots
Energy Saving ≈ 75%!!*



THE CONCEPT OF END OF LIFE

Steel Rebar



Expected End of Life ?? 100 years?

Electric Engine [Cu]



Expected End of Life ?? 10 years

Auto Vehicle [Al, Cu, Steel, others]



Expected End of Life ?? 25 years

Expected End of Life ?? ≤ 1 year



Expected End of Life ?? ≤ 4 years



BANK OF SCRAP
BANK OF ENERGY



INCREASING THE PROFIT

ULAB Industrial Battery



ULAB SLI Battery

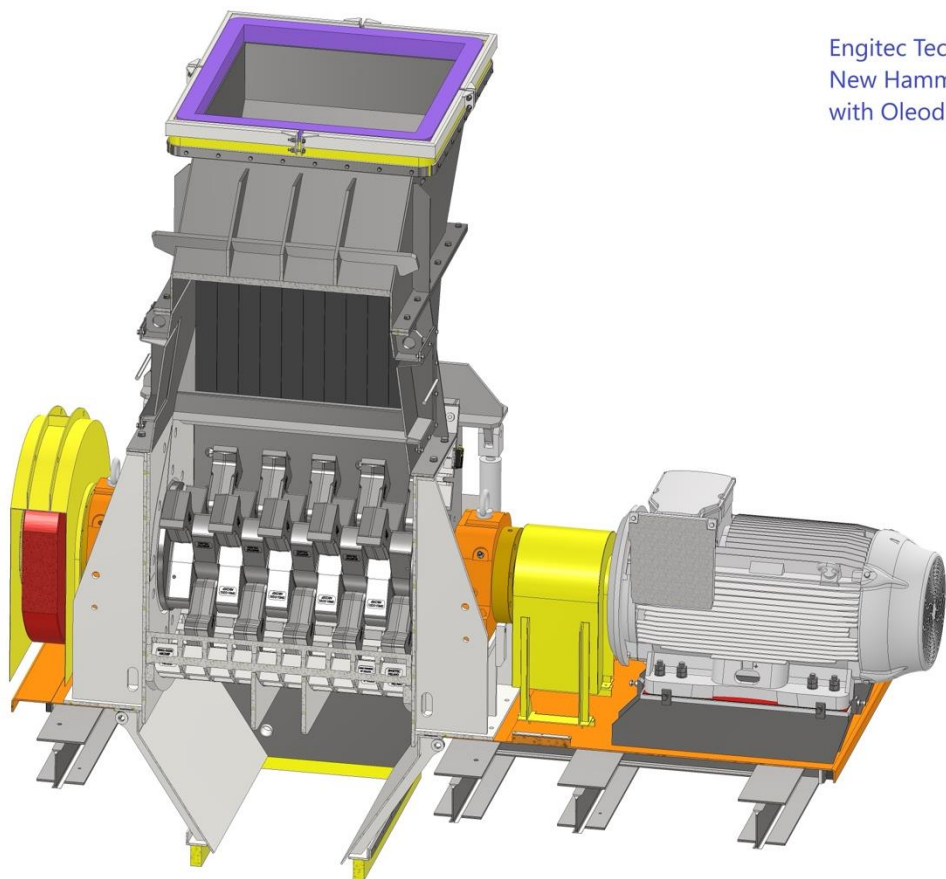


- a) Comparable purchase price for the two ULAB
- b) Lead recoverable content +5%÷6% of the ULAB Industrial
- c) In standard CX® Plants the load of ULAB industrial limited to 15% approx at the same process capacity in the crusher or
- d) reducing the process capacity with more than 15% ULAB industrial loaded
- e) At 100% ULAB Industrial the production speed reduced by 50%



- d) Practically we have chance to recover +0.9% of Lead
- e) + 6% lead content v/s 50% speed reduction....my losses in recovery are quite significative [44% approx.]

ENGITEC RETROFIT FOR PROCESSING 100% ULAB INDUSTRIAL BATTERIES



Engitec Technologies Spa
New Hammer Mill HD Series
with Oleodinamic Opening

INPUT DESIGN

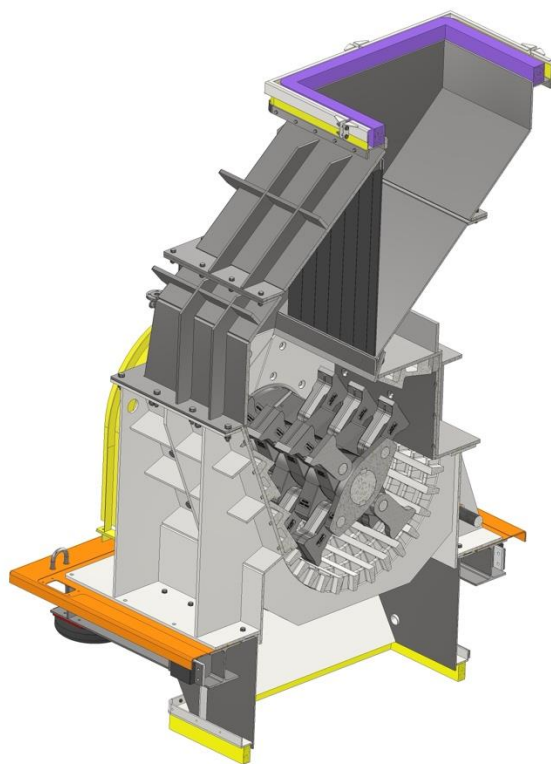
to process any possible mix of battery feed, including up to 100% of traction and similar type being the only restrictions referred to the max size of the battery and to the military (submarine) type .

THE NEW HAMMER MILL HD SERIES: DESIGN BASIS

- Starting from the Engitec Standard series that is composed by machines having the following sizes (corresponding to the width of the inlet port in mm)
- 650,
- 800,
- 1000,
- 1200,
- 1400,

the new HD series has been designed for the sizes 1000, 1200 and 1400

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DESIGN CRITERIA – RETROFT ALSO TO EXISTING PLANTS!!!

1. The mass moment of inertia of the rotor and flywheel shall be at least 60% bigger than the one of the standard series, which has been proven to be the minimum necessary for the comminution of the traction and similar type of battery at the nominal feed rate, being the slots of the cage bars at the standard size of 45mm
2. **The new HD mill shall be interchangeable with the one of the standard series of the same size, without the need of civil works**
3. The increase of the motor power shall not exceed the increase of the mass moment of inertia of rotor and flywheel of the correspondent size of the standard series
4. The operative life of the wear parts (hammers, discs, cage bars) shall be comparable with the one of the correspondent mill standard series

CONCLUSIONS

- In all industrial sectors SCARP is a great opportunity both for environment and for the wallet.
- The mix of scrap batteries varies continuously due to end of life considerations, due laws etc.
- Engitec, through its Engitec Research Center, through the Technological Dept and Aftersales Dept, is ready to provide consultancy for retrofitting existing Equipment so as to optimize the economical result of the CX[®] Plant in terms of OEE and OpEx.



REFERENCES

- [1] <https://international-aluminium.org/statistics/primary-aluminium-production/>
- [2] Marketing study of Engitec
- [3] <https://www.statista.com/statistics/254839/copper-production-by-country/#:~:text=Copper%20mine%20production%20worldwide%202010%2D2023&text=The%20total%20worldwide%20copper%20mine,million%20metric%20tons%20in%202010.>
- [4] Marketing study of Engitec
- [5] https://www.google.com/search?q=productio+of+steel+in+2023worldwide&rlz=1C1ONGR_itIT928IT928&oq=productio+of+steel+in+2023worldwide+&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCjE4NTE2ajBqMTWoAgiwAgE&sourceid=chrome&ie=UTF-8
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- [7] <https://www.statista.com/statistics/264871/production-of-lead-worldwide/#:~:text=In%202023%2C%20approximately%204.5%20million,radiation%20shield%2C%20among%20other%20uses.>
- [8] International Lead and Zinc Group (issue 5° October 2023)

Engitec is continuously committed to revise and updating its technologies to fulfil new regulations, new products constrains and customer requirements



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THANK YOU FOR LISTENING