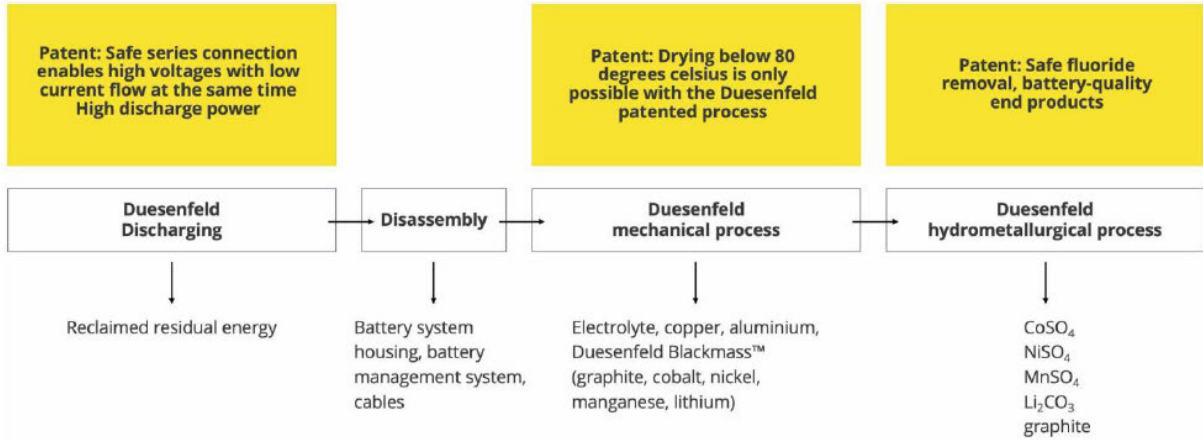


Claim	Evidence
1 [pre]: “A method for the treatment of used batteries, comprising the steps:”	Duesenfeld practices a method for treatment of used batteries, comprising the following steps, at its battery treatment plant located in Wendeburg, Germany. Ecofriendly Recycling of Lithium-Ion Batteries Duesenfeld is the pioneer in the recycling of Lithium-Ion Batteries and has developed a basic technology. In more than ten years, we have developed and licensed processes that do not require melting down or high-temperature treatment of batteries. Since the beginning, our processes have been focused on Ecofriendliness, CO₂ avoidance and the highest recycling efficiency. Through this technology, Duesenfeld combines eco-friendly with maximum economic efficiency.  Ex. 2053 at 3; Ex. 2040, ¶16; <i>see also</i>, Ex. 2053 at 7.

Duesenfeld Claim Chart

	“Duesenfeld began constructing its recycling plant in Wendeburg, Germany in 2017. The construction of the plant of this new technology took several years. We started a discontinuous operation in 2018 and went into a continuous multi-shift operation in 2020. At all times, the Wendeburg Plant has recycled batteries using vacuum drying at a maximum pressure of 300 hPa and at temperatures under 80°C. Videos featuring Duesenfeld’s plant are found at: https://www.youtube.com/watch?v=g1Ij4Emz8XQ (“How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, Dec. 6, 2023). Attached as Ex. 2053 is a brochure that describes the battery recycling process at Duesenfeld’s Wendeburg Plant.” Ex. 2040, ¶6 (Declaration of Lydia Grote).
1[a]: “(a) comminuting the batteries such that comminuted material is obtained;”	Duesenfeld practices “(a) comminuting the batteries such that comminuted material is obtained.”

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart



The components of a battery are all crushed to about two centimeters in diameter.

PHILIPS

5:48 / 14:41 • Shredding >

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	 The granules are then conveyed to a special vacuum dryer. How to recycle lithium-ion batteries? – Closing the loop in e-mobility VDI Zentrum Ressour... 31.4K subscribers Subscribe 130 Share Chat Replay is disabled for this Premiere. Ex. 2037 at timestamp 5:48-6:00 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at https://www.youtube.com/watch?v=g1Ij4Emz8XQ (“The components of a battery are all crushed to about two centimeters in diameter. The granules are then conveyed to a special vacuum dryer.”))
1[b]: “(b) inactivating the comminuted material such that an inactivated	Duesenfeld practices “(b) inactivating the comminuted material such that an inactivated comminuted material is obtained, wherein the inactivating step is performed during or after the comminuting step.”

comminuted material is obtained, wherein the inactivating step is performed during or after the comminuting step;” and	“In light of the stability of the black mass produced by the Duesenfeld process, Duesenfeld qualified for a special regulatory status that its black mass is no longer regulated as waste and, instead, it has product status. . . . Duesenfeld’s black mass is considered “end-of-waste” under the aforementioned Regulations because, <i>inter alia</i>, ‘its use does not lead to overall detrimental environmental or human health impacts.’ . . . Duesenfeld has been shipping its black mass to its customers since at least 2019 and has never had a complaint or issue relating to the chemical stability of the black mass.” Ex. 2040, ¶8 (Declaration of Lydia Grote) (citing Ex. 2042 (German Regulations (see Section 5 at pp. 10-11, “End-of-waste status”)) and Ex 2043 (certification from the authorities at the Braunschweig State Trade Supervisory Office to confirm this special status pursuant to Regulations)). <i>See also</i> Ex. 2044 and 2045, certified English translation and the Certificate of Translation of Ex. 2043. <table border="0"> <tr> <td data-bbox="489 841 703 906"> Hydrometallurgie - Battery grade </td><td data-bbox="915 841 1848 1287"> Duesenfeld has developed and patented its own process that enables full recycling through the production of battery-grade raw materials of the electrode active materials. » Lithium, cobalt, nickel and manganese are recovered in the form of salts, which serve as starting materials for the production of new cathode active materials » Removal of all disturbing fluorides by highly concentrated sulphuric acid at the beginning of the process. » Due to the low-temperature process, the graphite is not damaged and can be reused in new cells » End products: NiSO₄, CoSO₄, MnSO₄, Li₂CO₃ (battery grade) and graphite. </td></tr> </table> Ex. 2053 at 5; <i>see also</i> Ex. 2040, ¶¶6-7.	Hydrometallurgie - Battery grade	Duesenfeld has developed and patented its own process that enables full recycling through the production of battery-grade raw materials of the electrode active materials. » Lithium, cobalt, nickel and manganese are recovered in the form of salts, which serve as starting materials for the production of new cathode active materials » Removal of all disturbing fluorides by highly concentrated sulphuric acid at the beginning of the process. » Due to the low-temperature process, the graphite is not damaged and can be reused in new cells » End products: NiSO₄, CoSO₄, MnSO₄, Li₂CO₃ (battery grade) and graphite.
Hydrometallurgie - Battery grade	Duesenfeld has developed and patented its own process that enables full recycling through the production of battery-grade raw materials of the electrode active materials. » Lithium, cobalt, nickel and manganese are recovered in the form of salts, which serve as starting materials for the production of new cathode active materials » Removal of all disturbing fluorides by highly concentrated sulphuric acid at the beginning of the process. » Due to the low-temperature process, the graphite is not damaged and can be reused in new cells » End products: NiSO₄, CoSO₄, MnSO₄, Li₂CO₃ (battery grade) and graphite.		

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

	Vakuum drying - below 80 degrees <i>Id.</i>	The Duesenfeld process with mechanical shredding of the batteries and further hydrometallurgical processing of the black mass is a low-temperature process. During mechanical shredding and inactivation of the batteries, the drying process takes place below 80°C and at a low vacuum. Only under these conditions is no exhaust gas scrubbing necessary. Only in this temperature range can also the solvents of the electrolyte, the graphite and the lithium be recovered in a purity so that they can be reused. Through this technology, Duesenfeld combines environmental friendliness with maximum economic efficiency.
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Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart



The components of a battery are all crushed to about two centimeters in diameter.

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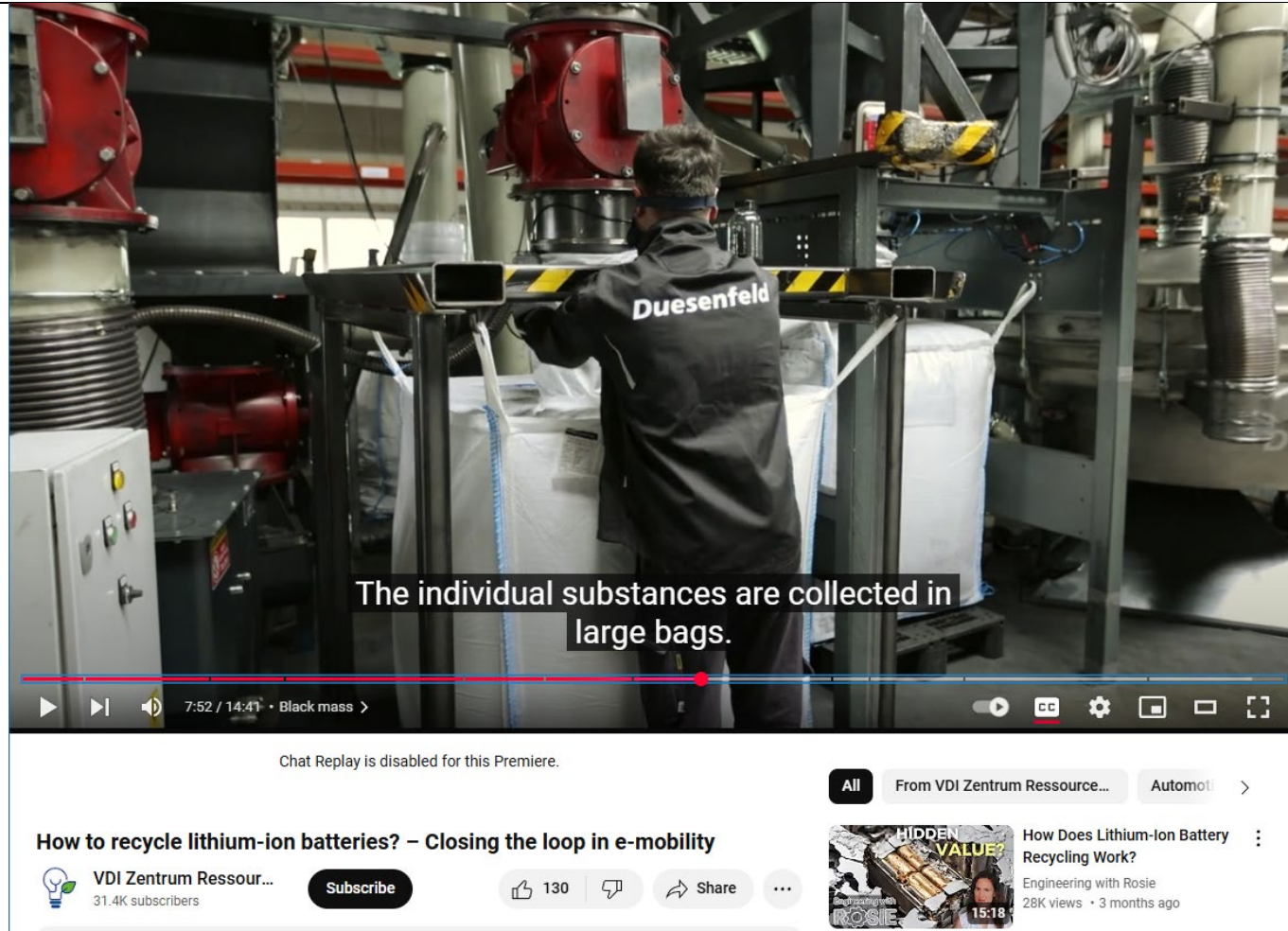
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	 The granules are then conveyed to a special vacuum dryer. How to recycle lithium-ion batteries? – Closing the loop in e-mobility VDI Zentrum Ressour... 31.4K subscribers Subscribe 130 Share Chat Replay is disabled for this Premiere. Ex. 2037 at timestamp 5:48-6:00 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at https://www.youtube.com/watch?v=g1Ij4Emz8XQ (“The components of a battery are all crushed to about two centimeters in diameter. The granules are then conveyed to a special vacuum dryer.”))
1 [c]: "(c) filling a transport container	Duesenfeld practices "(c) filling a transport container with the inactivated comminuted material."

with the inactivated
comminuted material;”

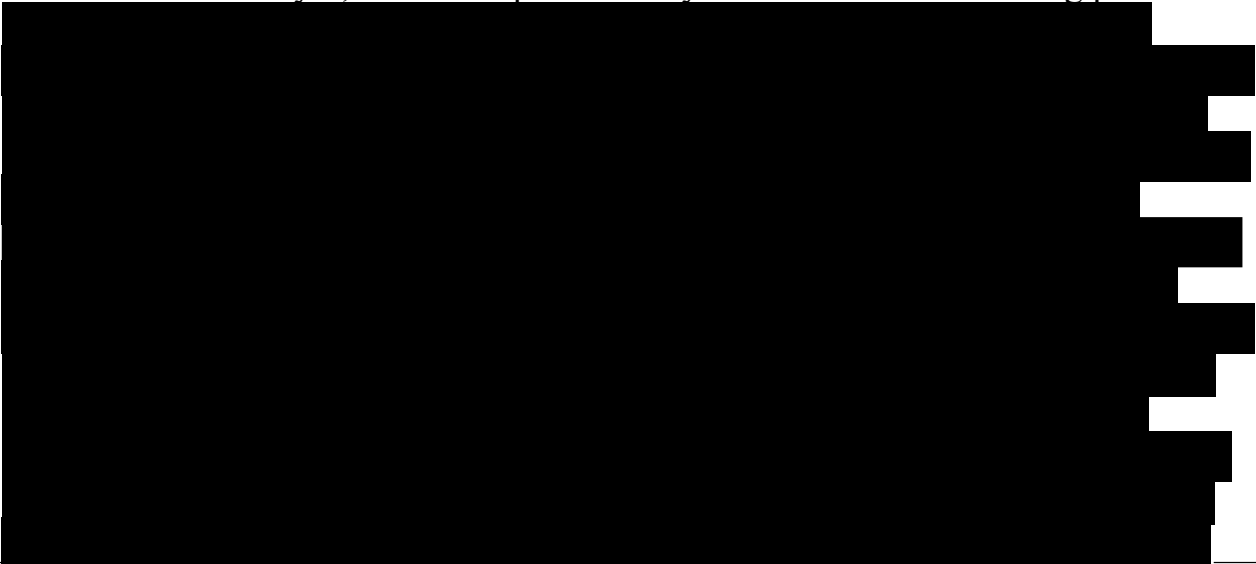


Ex. 2037 at timestamp 7:52-8:03 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at <https://www.youtube.com/watch?v=g1Ij4Emz8XQ> (“The individual substances are collected in large bags. The valuable substances such as cobalt, Nickel, manages and lithium – as well as the graphite – are now in a powder-like black material.”))

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

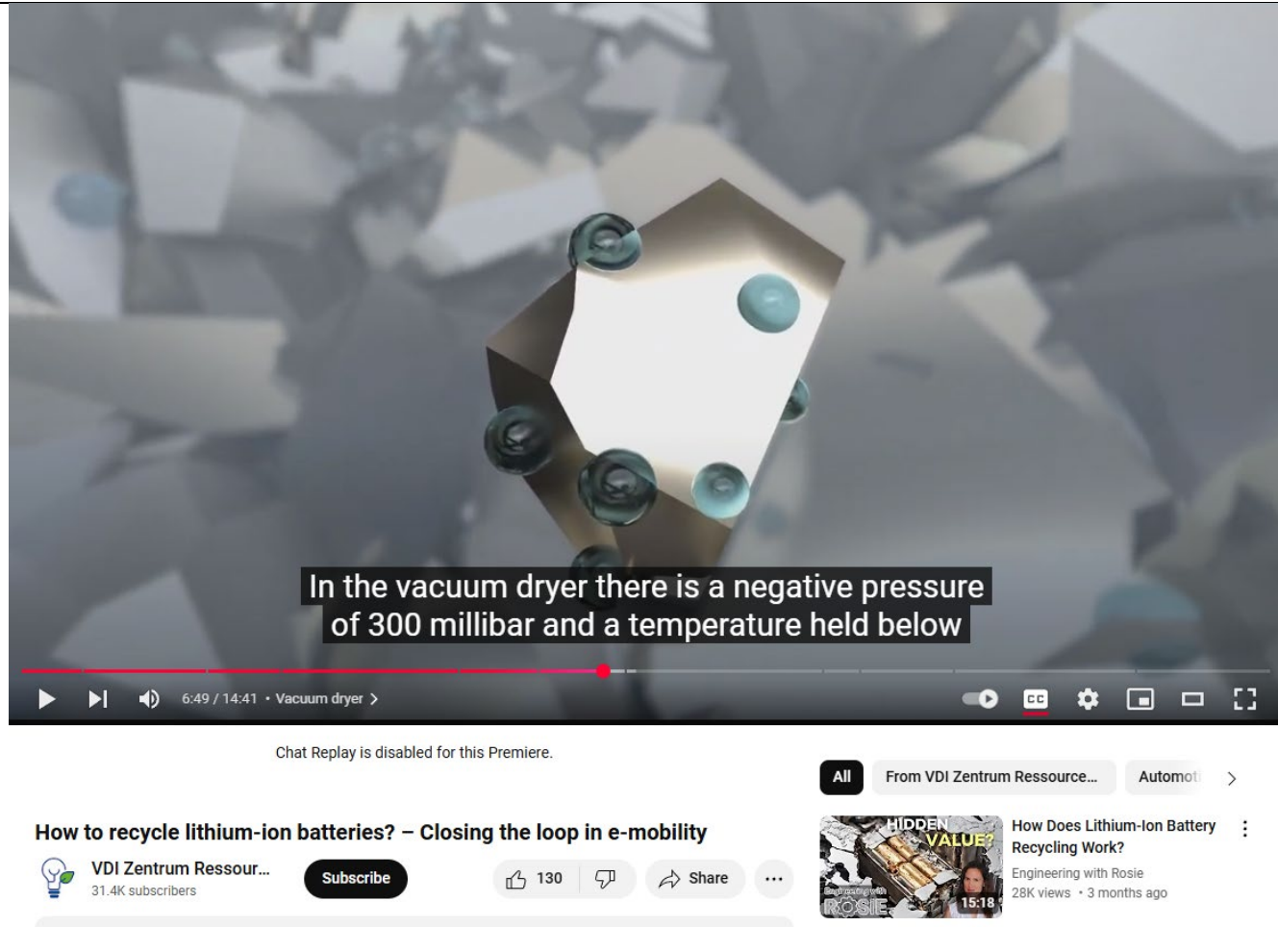
[d]: "wherein the inactivating step is performed by drying the comminuted material, and"	Duesenfeld practices "wherein the inactivating step is performed by drying the comminuted material." Vakuum drying - below 80 degrees The Duesenfeld process with mechanical shredding of the batteries and further hydrometallurgical processing of the black mass is a low-temperature process. During mechanical shredding and inactivation of the batteries, the drying process takes place below 80°C and at a low vacuum. Only under these conditions is no exhaust gas scrubbing necessary. Only in this temperature range can also the solvents of the electrolyte, the graphite and the lithium be recovered in a purity so that they can be reused. Through this technology, Duesenfeld combines environmental friendliness with maximum economic efficiency. Ex. 2053 at 5; <i>see also</i> Ex. 2040, ¶¶6-7.
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	 The granules are then conveyed to a special vacuum dryer. How to recycle lithium-ion batteries? – Closing the loop in e-mobility VDI Zentrum Ressour... 31.4K subscribers Subscribe 130 Share Chat Replay is disabled for this Premiere. Ex. 2037 at timestamp 5:48-6:00 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at https://www.youtube.com/watch?v=g1Ij4Emz8XQ (“The components of a battery are all crushed to about two centimeters in diameter. The granules are then conveyed to a special vacuum dryer.”))
1 [e]: "wherein the drying occurs at a	Duesenfeld practices "wherein the drying occurs at a maximum pressure of 300 hPa."

maximum pressure of 300 hPa."	"Duesenfeld began constructing its recycling plant in Wendeburg, Germany in 2017. The construction of the plant of this new technology took several years. We started a discontinuous operation in 2018 and went into a continuous multi-shift operation in 2020. At all times, the Wendeburg Plant has recycled batteries using vacuum drying at a maximum pressure of 300 hPa and at temperatures under 80°C. Videos featuring Duesenfeld's plant are found at: https://www.youtube.com/watch?v=g1Ij4Emz8XQ ("How to recycle lithium-ion batteries? – Closing the loop in e-mobility", Dec. 6, 2023). Attached as Ex. 2053 is a brochure that describes the battery recycling process at Duesenfeld's Wendeburg Plant." Ex. 2040, ¶6 (Declaration of Lydia Grote). "Attached as Exhibit 2041 are graphs showing the temperature and pressure conditions in the dryer, which we permanently record at our Wendeburg plant. 
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	Ex. 2040, ¶7 (Declaration of Lydia Grote) (discussing Ex. 2041).
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Ex. 2041; *see also* Ex. 2040, ¶7 (Declaration of Lydia Grote) (discussing Ex. 2041).



In the vacuum dryer there is a negative pressure of 300 millibar and a temperature held below

6:49 / 14:41 • Vacuum dryer >

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Duesenfeld Claim Chart



80 degrees Celsius.

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Ex. 2037 at timestamp 6:45-7:00 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at <https://www.youtube.com/watch?v=g1Ij4Emz8XQ>) (In the vacuum dryer there is a negative pressure of 300 millibar and a temperature held below 80 degrees Celsius. The electrolyte evaporates and the lithium precipitates as a result of this.”)

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

3: "The method according to claim 1, wherein the drying occurs under vacuum."	Vakuum drying - below 80 degrees The Duesenfeld process with mechanical shredding of the batteries and further hydrometallurgical processing of the black mass is a low-temperature process. During mechanical shredding and inactivation of the batteries, the drying process takes place below 80°C and at a low vacuum. Only under these conditions is no exhaust gas scrubbing necessary. Only in this temperature range can also the solvents of the electrolyte, the graphite and the lithium be recovered in a purity so that they can be reused. Through this technology, Duesenfeld combines environmental friendliness with maximum economic efficiency. Ex. 2053 at 5; Ex. 2040, ¶¶6-7; <i>see also</i> claim 1, generally.
8: "The method according to claim 1 wherein the batteries are lithium batteries."	<i>See</i> claim 1, generally. Ecofriendly Recycling of Lithium-Ion Batteries Duesenfeld GmbH researches and develops industry-oriented eco-friendly recycling processes for lithium-ion batteries, supplying graphite, electrolytes and lithium for material recycling in addition to the usual metals. Duesenfeld licenses the CO2 neutral and economical technology to automotive manufacturers, cell producers and recycling companies worldwide. Duesenfeld is constantly researching the best recycling technology ecologically and economically and continuously communicates solutions to license customers to meet upcoming regulatory requirements and beyond. Ex. 2053 at 2; Ex. 2040, ¶¶6-7.

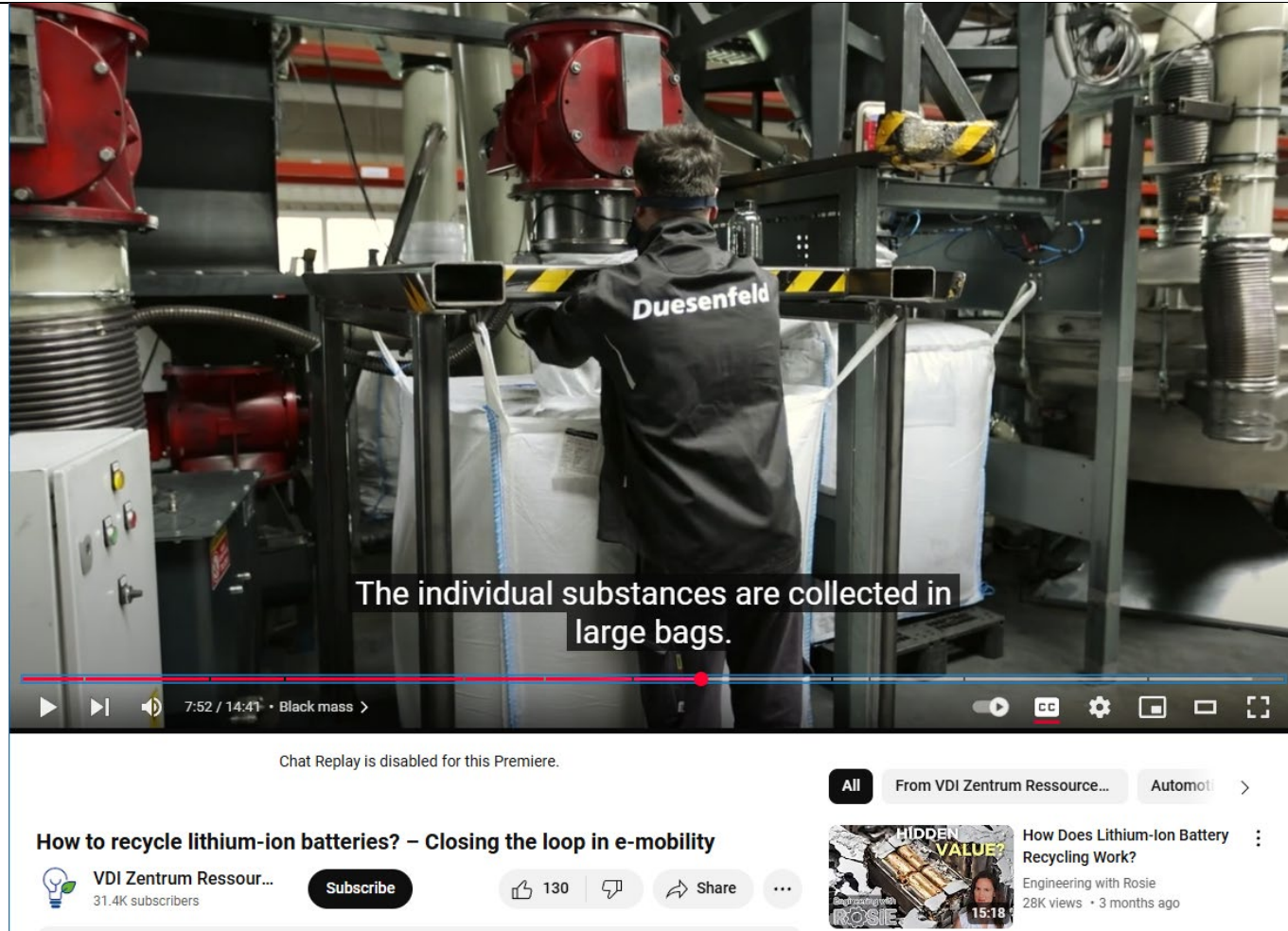
Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

	Ecofriendly Recycling of Lithium-Ion Batteries Duesenfeld is the pioneer in the recycling of Lithium-Ion Batteries and has developed a basic technology. In more than ten years, we have developed and licensed processes that do not require melting down or high-temperature treatment of batteries. Since the beginning, our processes have been focused on Ecofriendliness, CO₂ avoidance and the highest recycling efficiency. Through this technology, Duesenfeld combines eco-friendly with maximum economic efficiency. Ex. 2053 at 3; Ex. 2040, ¶¶6-7.
9: "The method according to claim 1 wherein drying occurs at a temperature of less than 80° C."	Vakuum drying - below 80 degrees The Duesenfeld process with mechanical shredding of the batteries and further hydrometallurgical processing of the black mass is a low-temperature process. During mechanical shredding and inactivation of the batteries, the drying process takes place below 80°C and at a low vacuum. Only under these conditions is no exhaust gas scrubbing necessary. Only in this temperature range can also the solvents of the electrolyte, the graphite and the lithium be recovered in a purity so that they can be reused. Through this technology, Duesenfeld combines environmental friendliness with maximum economic efficiency. Ex. 2053 at 5; Ex. 2040, ¶6. Regulations for the Recycling of Lithium-Ion Batteries Worldwide, there are regulatory restrictions on CO₂ emissions, recycling rates by weight and product purities for the recycling of Lithium-Ion Batteries. Thanks to the aforementioned advantages, the existing and announced requirements to minimize the carbon footprint of EV batteries can already be fully met by the Duesenfeld process. The extensive advantages of drying below 80 degrees are only possible with the patented Duesenfeld process.

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

	<i>Id.</i> at 6. <i>See also</i> Ex. 2040, ¶7 (Declaration of Lydia Grote) [REDACTED] [REDACTED] [REDACTED] (discussing Ex. 2041).
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10: "The method according to claim 1 further comprising a step of sealing the transport container so as to be dust-tight after the step of filling with the inactivated comminuted material."



Ex. 2037 at timestamp 7:52-8:03 (Video “How to recycle lithium-ion batteries? – Closing the loop in e-mobility”, available at <https://www.youtube.com/watch?v=g1Ij4Emz8XQ> (“The individual substances are collected in large bags. The valuable substances such as cobalt, Nickel, manages and lithium – as well as the graphite – are now in a powder-like black material.”))

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

12[pre]: "A battery processing installation for treatment of used batteries, comprising:"	<i>See claim 1 [pre].</i>
12[a]: "(a) a comminution unit configured to comminute the batteries such that comminuted material is obtained;	<i>See claim 1[a].</i>
12[b]: "(b) an inactivation device comprising a drying device configured to inactivate the comminuted material, wherein the inactivation device is configured to perform the inactivating step during or after the comminuting step of the comminution unit;"	<i>See claim 1[b].</i>

Ascend v. Duesenfeld IPR2024-00887
Duesenfeld Claim Chart

12[c]: "(c) a filling device configured to fill a transport container with the inactivated comminuted material; and"	<i>See claim 1[c].</i>
12[d]: "(d) a vacuum installation connected to the drying device and configured to generate a vacuum in the drying device."	<i>See claim 1[e].</i>
19: "The battery processing installation of claim 12 wherein the batteries are lithium batteries."	<i>See claims 1, 8.</i>