

# RATAJ<sup>®</sup>

## SHAFTLESS SCREW CONVEYORS



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FEEDERS AND WEIGHING CONVEYORS

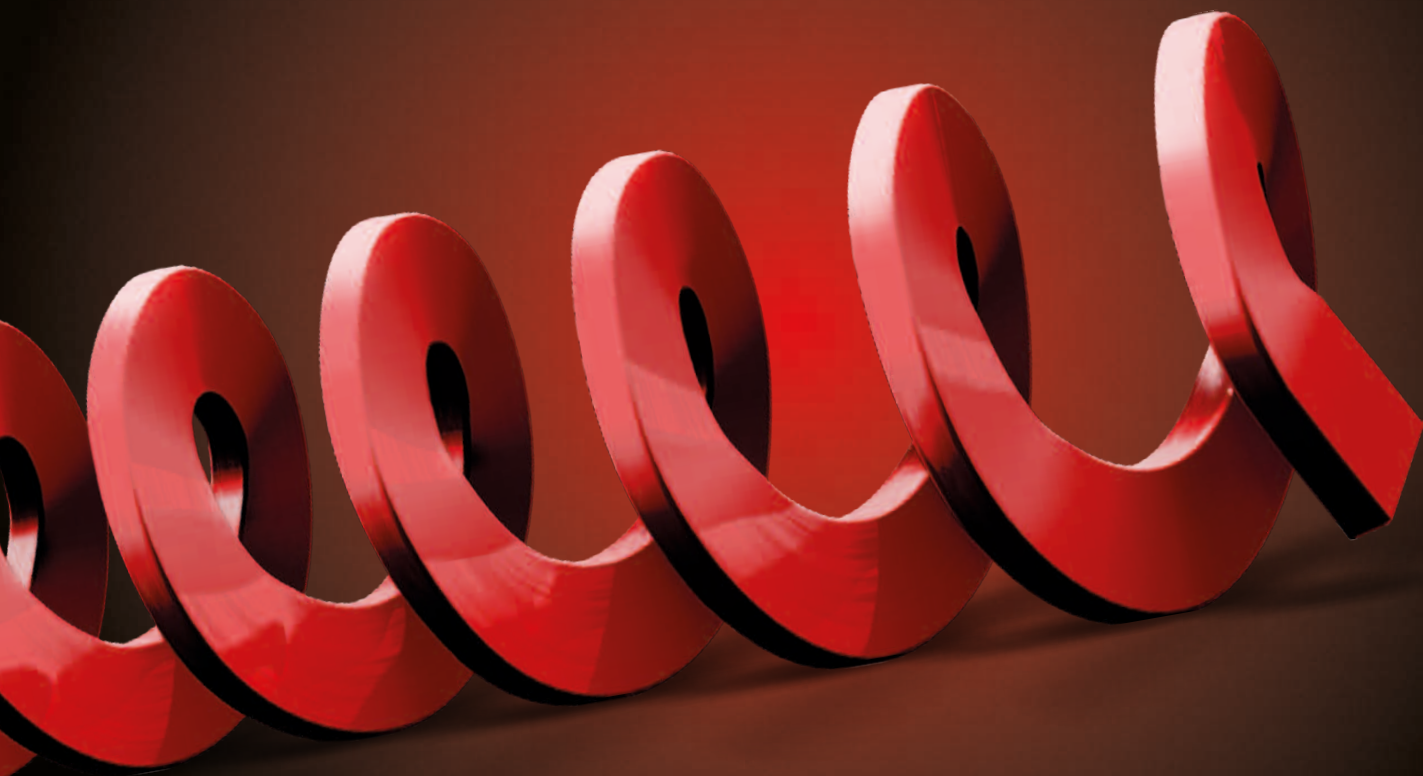
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BIG BAG STATIONS

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1990 – 2020



... power of idea

# COMPANY PROFILE

RATAJ a.s.



- A private company was founded by Stanislav Rataj (today's chairman of the board of directors) to produce and supply technical products for the agricultural industry. Included in these supplies were shaftless flexible screw conveyors of the type SL, initially used for the conveying of light loose materials.
- 1990 ●
- 1994 ● Ing. Stanislav Rataj (today's chairman of the board of directors of the RATAJ a.s.) formed a company solely for the production of shaftless screw conveyors. In addition to flexible shaftless screws, rigid conveyors of the type RL were also produced.
- Founding of RATAJ s.r.o. and achieving the leading position in the Czech and Slovak markets for the manufacture and supply of shaftless screw conveyors of both flexible and rigid types.
- 1999 ●
- 2000 ● A quality system meeting the requirements of CSN EN ISO 9002 was introduced and in 2003 upgraded to CSN EN ISO 9001:2001. Since that period, a significant increase in the export of conveyors manufactured by RATAJ s.r.o. has taken place, not only to Europe but also to Africa, America, and Asia.
- RATAJ SK s.r.o. was founded in the Slovak Republic. A warehouse for screws conveyors was opened for Slovakia.
- 2003 ●
- 2004 ● Start of construction of a new production complex for the RATAJ Company on a 17,500 m<sup>2</sup> plot of land, building the warehouse and production premises covering 1,200 m<sup>2</sup>.
- Purchase of CNC technology for cutting materials using a high-pressure stream.
- 2006 ●
- Transformation of RATAJ s.r.o. to the RATAJ a.s. joint-stock company. During participation at an engineering fair in Japan (Osaka), a contract for exclusive representation of RATAJ a.s. in Japan was concluded.
- 2007 ●
- 2010 ● 20 years of existence of the RATAJ company. Opening of the administration building, training centre with the participation of RATAJ a.s. key customers and suppliers. Granting of the first patent to RATAJ a.s. for a shaftless screw cooler for loose material.
- Establishment of RATAJ POLSKA Sp. z o.o. and opening of a dealership of the RATAJ company in Germany.
- 2011 ●
- 2012 ● The company was granted the CZECH MADE mark for the manufacture of shaftless screw conveyors. Development and deliveries of hard alloy shaftless screws with a diameter of 600 mm.
- Initiation of manufacturing of composite screw conveyors, hard alloy screw segments and alloy lining of conveyor tubes RATABEN®.
- 2013 ●
- 2015 ● 25th anniversary of RATAJ business
- Manufacture of the world's largest shaftless screw conveyors with Ø800mm screw for unloading agricultural commodities from ships in Stavanger, Norway.
- 2018 ●
- 2019 ● Start of the construction of a second production hall.
- 2020 ● 30th anniversary of RATAJ business

# POWER OF IDEA INGENIOUSLY SIMPLE PRINCIPLE

Excellent technical designs usually have a common feature. They work on the basis of a simple principle, they are reliable, efficient, and have versatile applications. **RATAJ**® shaftless screw conveyors share these principles.

The basic element of **RATAJ**® shaftless screw conveyors is a shaftless screw made of first-class steel of 3 to 60 mm thickness and outside diameters ranging from 25 to 800 mm.

A shaftless screw conveyor contains no internal bearings or shaft and transported material fills nearly the entire conveyor cross-section. The shaftless screw, with its precisely defined cross-section and rotating motion, allows transporting a large quantity of material at low rpm and with minimum electricity consumption or, on the other hand, very small amounts of material for dosing purposes.



RL 280 - Fly ash (Czech Republic)

## BENEFITS OF RATAJ® SHAFTLESS SCREW CONVEYORS

- All coupling dimensions of our conveyors are adapted for the customer's technology.
- Simple and reliable operation, bespoke design, long service life and big capacity.
- Trouble-free transport of materials with extreme physical properties (very abrasive, pieced, flowing, adhesive, dusty, etc.).
- Smaller investment and operating costs as compared to belt conveyors, chain conveyors, and pneumatic transport.
- Long term operation without the need for repairs or preventive maintenance.
- Dust-free operation.
- Simple and quick repairs of screws and piping.
- Precise dosing and continuous weighing of the conveyed material.
- Compact dimensions of the conveyor and gear units.
- Design of the conveyor complying with the requirements for installation into a zone with dust and danger of explosion - ATEX.
- The option of conveyor design complying with explosion resistance up to 1.0 MPa.



RL 240 - Limestone (Czech Republic)



RL 180 - Glass dust (Czech Republic)

# 30 YEARS OF DEVELOPMENT OF RATAJ® SHAFTLESS SCREW CONVEYORS

Each **RATAJ®** shaftless screw conveyor is designed and manufactured according to the customer's requirements and for the specific type of conveyed material. This approach allows optimum customization of shaftless screw conveyors for various types of materials and technology.

Based on our experience with over 5,000 conveyors manufactured and installed in many industrial areas and based on our development of sections of screws and tubes, we are constantly developing new designs for a constantly expanding range of conveyor materials for our customers. Our considerable experience in manufacturing and operating shaftless screw conveyors is used in the design of all shaftless screw conveyors for hundreds of different materials.

For the first time since the invention of shaftless screws, the **RATAJ®** company has manufactured the world's largest shaftless screw conveyor with the screw diameter of 800 mm and in 2016 also the first plastic shaftless screw. Since 2013 we have been manufacturing shaftless screws fitted with welded hard-alloy sections as well as anti-abrasive alloy plates for piping for the delivery of extremely abrasive materials. These worldwide unique products put the **RATAJ®** company at the forefront of the technical development in the manufacture and supply of shaftless screw conveyors. In 2016 we launched a rigid conveyor with rubber insert onto the market for the first time.



RL 200 - Bentonite (Slovakia)



RL 400 - Jalousie (Slovakia)



RLN 90 - Sugar (Czech Republic)



RLN 80 - Salmon food (Chile, Norway, Estonia)

# FLEXIBLE SHAFTLESS SCREW CONVEYORS



**RATAJ®** flexible shaftless screw conveyors (types SL, SLK, SLN, SLP)

are used for the transport of fine and light materials with transport capacity from about 0.001 to 15 m<sup>3</sup>/hr. A major advantage of these conveyors is the possibility of transport in curves and over large distances up to 120 m per drive unit. Along the entire transport route, there is no intermediate bearing (with the exception of an end bearing in some cases), which allows transport of material in the entire section at a performance about 70% higher than the capacity of classic worm conveyors with a shaft with comparable speed and conveyor diameter.

The main application of flexible shaftless screw conveyors is in the food processing, chemical, and plastic industries for dosing into packaging machines and weighing equipment. It is possible to have several inlets, outlets, and curves in one conveyor depending on the physical properties of the material conveyed and the site conditions. The construction material of the conveyors can be steel, stainless or plastic, based on the requirements of the customer. The screw profile is rectangular, square or circular.




## FLEXIBLE SHAFTLESS SCREW CONVEYORS

Type *1/	Outer screw diameter (mm) (tolerance ±1-2 mm) *3	Pitch (mm) (tolerance ±1-5 mm)	Inner screw diameter (mm) (tolerance ±1-2 mm)	Screw thickness mm	Capacity m <sup>3</sup> /hr *2/
SL 36	36	36	20	3	0,001 – 0,5
SL 38/31	38	31	22	4	0,001 – 0,5
SLN 38/31	38	31	22	4	0,001 – 0,5
SLN 52/37	52	37	28	4,7	0,001 – 1,5
SLN 52/37	52	37	32	3,4	0,001 – 1,5
SL 53/37	53	37	33	4,3	0,001 – 1,5
SL 60/40	60	40	36	4,3	0,001 – 1,5
SL 60/50	60	50	36	4,3	0,001 – 1,5
SLK 60/40	60	40	48	6	0,001 – 1,5
SL 61/42	61	42	37	5	0,001 – 1,5
SL 61/60	61	60	37	4	0,001 – 1,5
SLN 61/42	61	42	37	4,7	0,001 – 1,5
SL 68/50	68	50	44	5	0,001 – 4,0
SL 68/60	68	60	44	4	0,001 – 4,0
SL 68	68	68	44	7	0,001 – 4,0
SLK 68/50	68	50	52	8	0,001 – 3,0
SLN 68/50	68	50	44	4,7	0,001 – 4,0
SLN 68/60	68	60	44	4	0,001 – 4,0
SLNK 68/50	68	50	52	8	0,001 – 4,0
SL 70/50	70	50	46	4,3	0,001 – 4,0
SL 70/65	70	65	46	4,3	0,001 – 4,0
SLK 70/65	70	65	46	12	0,001 – 4,0
SLN 90/60	90	60	66	4,7	0,001 – 15,0
SLN 94/66	94	66	66	5	0,001 – 15,0
SL 95/66	95	66	66	5	0,001 – 15,0
SLK 100/70	100	70	76	12	0,001 – 12,0



Material design:

Screw: Type **SL, SLK** - steel (according to the standard EN - S 235, S 355)  
Type **SLN** - stainless steel (according to the standard ASTM - AISI 302)

Profile:  rectangular  
 circular  
 square

Tubes: Type **SL** - steel (according to the standard EN - S 235, S 355)  
Type **SLN** - stainless steel (according to the standard ASTM - AISI 304, AISI 316)  
Type **SLP** - plastic (PVC, PA 6, PA 12, POM, PE)

Depending on the type of material conveyed and specific site conditions, combinations of material designs and dimensional variations of screws different from the table above are sometimes used.

\*1/ Types marked red = stainless design of the screw and the tubes

\*2/ Transport performances of individual conveyors depend on the type and physical properties of the material conveyed.

\*3/ Conveyor outside diameters depend on the type and physical properties of the material conveyed.

# RIGID SHAFTLESS SCREW CONVEYORS

**RATAJ®** rigid shaftless screw conveyors (types RL, RLH, RLN, RLP, RR, RRL, RRN and RLE) are designed for the transport of abrasive, large particle, and adhesive materials or for high Capacity up to 1000 m<sup>3</sup>/hr. These are especially designed for conveying highly abrasive materials (coal, corundum grit, gravel, sand, crushed rock, grinding dust, blast furnace and electrical power plant cinder, ceramic materials etc.), conveying materials with large particle sizes (PET bottles, wood, wood chips, paper, biomass, crushed tyres etc.), conveying adhesive and wet materials (waste sludge, soil, bentonite, pulp materials, etc.), and conveying very delicate and flowing materials (food powder, chemicals, fly ash, etc.).

With the correct application and technical design of shaftless screw conveyors, we can often solve a complicated problem for the customer, if other types of mechanical transport cannot be used.

Rigid screws from two or three connected profiles can be used for highly loaded conveyors (long transport distances, transport of materials with very high bulk density etc.). The thickness of the shaftless screws may be up to 60 mm and the diameter up to 800 mm. Thanks to the high quality of the rigid screws we produce shaftless screw conveyors for pulling or pushing the conveyed material, conveyors connected perpendicularly (fixing system) and vertical shaftless screw conveyors instead of classic bucket elevators.

The maximum lengths of rigid screw conveyors installed are up to a distance of 55 m in horizontal arrangements and 25 m in vertical arrangements per drive unit.

We have a corresponding screw, tube and trough material design for every industry.

Very often we replace existing conventional applications of worm conveyors, chain conveyors, belt conveyors and bucket elevators with our shaftless screw conveyors.

There is practically no spatial limitation for the transport direction for shaftless screw conveyors. There are many applications where filling and emptying containers from the horizontal and vertical direction, the transport of materials between floors of technology lines or the high capacity long distance transport of materials are used.



# RIGID SHAFTLESS SCREW CONVEYORS

Type *1/	Outer screw diameter (mm) (±1-5 mm) *3	Pitch (mm) (±1-10 mm)	Inner screw diameter (mm) (±1-3 mm)	Screw thickness mm	Capacity m <sup>3</sup> /hr *2/
RLN 25/15	25	15	12	6	0,001 – 0,2
RLN 28/25	28	25	10	4	0,001 – 0,2
RLN 45/40	45	40	15	5	0,001 – 0,3
RLN 50/60	50	60	20	8	0,01 – 0,5
RL 45/40	45	40	15	5	0,01 – 1,5
RLN 53/58	53	58	15	4	0,01 – 0,5
RL 60	60	60	20	5	0,01 – 1,5
RLN 60/30	60	30	30	4	0,01 – 0,5
RL 66/75	66	75	42	12	0,01 – 0,5
RLN 75/80	75	80	27	5	0,01 – 0,5
RLN 77/75	77	75	37	8	0,01 – 1,5
RL 75/80	75	80	27	6	0,01 – 2,0
RL 80/65	80	65	27	6	0,01 – 2,0
RL 80	80	80	22	7	0,01 – 2,0
RLN 80/65	80	65	27	5	0,01 – 2,0
RLN 80	80	80	27	5, 6	0,01 – 2,0
RL 90/60	90	60	34	6	0,01 – 2,5
RL 90	90	90	34	6	0,01 – 3,0
RL 90/110	90	110	50	22	0,01 – 3,0
RLN 90/60	90	60	34	5	0,01 – 2,5
RLN 90	90	90	34	5, 6	0,01 – 3,0
RL 100/75	100	75	34	6	0,01 – 3,0
RL 100	100	100	27, 34	6	0,01 – 4,0
RL 105/80	105	80	48	6	0,01 – 4,0
RLN 100/75	100	75	34	5, 6	0,02 – 3,0
RLN 100	100	100	34	7	0,03 – 4,0
RL 110/75	110	75	34	6	0,03 – 5,0
RL 110/80	110	80	48	6	0,03 – 5,0
RL 110	110	110	34	6, 12	0,03 – 6,0
RLN 110	110	110	34	5, 8 11	0,03 – 6,0
RL 120/75	120	75	34	6	0,03 – 6,0
RL 120/80	120	80	38	6	0,03 – 6,0
RL 120/105	120	105	44	5	0,03 – 6,0
RL 120	120	120	38	6, 8	0,04 – 7,0
RL 125	125	125	85	15	0,03 – 2,0
RLN 120/80	120	80	38	5	0,02 – 6,0
RLN 120	120	120	38, 40	5, 10	0,04 – 7,0
RL 130	130	130	38	6	0,03 – 6,0
RL 130/140	130	140	48	10	0,03 – 6,0
RL 140/100	140	100	49	8	0,1 – 7,0
RL 140	140	140	40, 49	7, 8, 10, 12	0,1 – 10,0
RLN 140/100	140	100	49	8	0,1 – 7,0
RLN 140	140	140	49, 52	8, 10	0,1 – 10,0
RL 150/100	150	100	61	6	0,2 – 13,0
RL 150/105	150	105	49	8	0,2 – 13,0
RL 150	150	150	48, 49, 50, 60	8, 10, 12, 15	0,2 – 15,0
RLN 150/100	150	100	62	10	0,2 – 15,0
RLN 150/140	150	140	54	10	0,2 – 15,0
RLN 150	150	150	49, 50	8, 12	0,2 – 15,0
RLN 150/170	150	170	50	10	0,2 – 15,0
RLN 150/180	150	180	50	10	0,2 – 15,0
RL 160/105	160	105	49	12	0,1 – 8,0
RL 160	160	160	49, 60	12, 20	0,1 – 12,0
RLN 160/150	160	150	49	10	0,2 – 15,0
RLN 170/180	170	180	60	15	0,2 – 15,0
RL 180	180	180	49, 61, 66	10, 12, 15	0,3 – 20,0
RLN 180	180	180	60, 61, 76	10, 12, 15, 18	0,3 – 20,0
RLN 180/135	180	135	61	9	0,3 – 20,0
RL 190/135	190	135	61	12	0,5 – 25,0
RL 195	195	195	95	20	0,5 – 25,0
RL 200/135	200	135	61	12	0,4 – 20,0

Type *1/	Outer screw diameter (mm) (±1-5 mm) *3	Pitch (mm) (±1-10 mm)	Inner screw diameter (mm) (±1-3 mm)	Screw thickness mm	Capacity m <sup>3</sup> /hr *2/
RL 200	200	200	61, 65	12, 15	0,5 – 25,0
RL 200/250	200	250	76	12	0,5 – 25,0
RLN 200/135	200	135	61	10, 12	0,5 – 20,0
RLN 200	200	200	61, 85	10, 15	0,5 – 20,0
RL 220	220	220	61	12	0,5 – 20,0
RL 230/160	230	160	61	12	0,5 – 15,0
RL 230	230	230	76, 80, 92, 130	12, 14, 20	0,5 – 20,0
RLN 230/160	230	160	60	10	0,5 – 20,0
RLN 230	230	230	76	10, 12	0,5 – 25,0
RL 240/145	240	145	140	20	0,5 – 15,0
RL 240	240	240	76	12	0,5 – 15,0
RLN 240/145	240	145	76	10	0,5 – 20,0
RL 250/150	250	150	42	15	0,5 – 20,0
RL 250/170	250	170	76	12	0,5 – 20,0
RL 250/200	250	200	89	12, 14	0,5 – 20,0
RL 250	250	250	76	12, 20	0,5 – 30,0
RL 250/280	250	280	89	12	0,5 – 30,0
RLN 270/200	270	200	102	12	0,5 – 25,0
RL 275/280	275	280	90	15	0,5 – 40,0
RLN 275/260	275	260	80	12	0,5 – 25,0
RL 280/190	280	190	89	12	0,5 – 30,0
RL 280	280	280	89, 100, 104, 135	12, 15, 17, 20, 25, 35	0,5 – 40,0
RL 280/320	280	320	160	25	0,5 – 40,0
RLN 280	280	280	89	10, 12	0,5 – 40,0
RL 300/160	300	160	76	12	0,5 – 50,0
RL 300	300	300	89, 105	12, 26	0,5 – 70,0
RLN 300	300	300	90	10, 12	0,5 – 70,0
RL 315/210	315	210	102	12	0,5 – 60,0
RL 315	315	315	102	12	0,5 – 70,0
RLN 330/250	330	250	102	20	0,5 – 70,0
RL 340	340	340	130	12	1,0 – 150,0
RL 350	350	350	102, 169	12	1,0 – 150,0
RLN 350	350	350	102	20	1,0 – 150,0
RL 380	380	380	180	25	1,0 – 150,0
RL 400/265	400	265	120	12	2,0 – 100,0
RL 400	400	400	120, 160	12, 40	3,0 – 200,0
RLN 400	400	400	122	15	3,0 – 200,0
RLN 450/370	450	370	130	15	1,0 – 150,0
RL 500	500	500	140	12, 30, 50	4,0 – 300,0
RLN 500	500	350	160	15	3,0 – 200,0
RL 520/360	520	360	273	25	5,0 – 300,0
RL 600/350	600	350	273, 323	20, 25, 30	3,0 – 300,0
RL 600/400	600	400	169	12	3,0 – 300,0
RL (H) 600/500	600	500	300	30, 40	3,0 – 200,0
RL 600	600	600	169, 240	12, 25	5,0 – 600,0
RL 800/600	800	600	344, 600	30	10,0 – 1000,0

Material design:

Screw: Type **RL** - steel (according to the standard EN - S 235, S 355)

Type **RLN** - stainless steel (according to the standard ASTM - AISI 304, AISI 310, AISI 316)

Tubes: Type **RL** - steel (according to the standard EN - S 235, S 355)

Type **RLN** - stainless steel (according to the standard ASTM - AISI 304, AISI 310, AISI 316, AISI 321)

Type **RLP** - plastic PP

Type **RRL, RRN** - polyamide inserts RATAMID®

Type **RLE** - basalt inserts

\*1/ Types marked red = stainless design of the screw and the tubes.

\*2/ Transport performances of individual conveyors depend on the type and physical properties of the material conveyed.

\*3/ Conveyor outside diameters depend on the type and physical properties of the material conveyed.

# CONVEYORS FOR THE TRANSPORT OF FUEL INTO AUTOMATIC BOILERS

The conveyors (types DU, DP) are designed for fuel transport to the fuel bins of automatic boilers, under bins as an unloading or dosing device, or as supply conveyors for filling tanks, bunkers, storage containers etc. They are designed for the transport of wooden pellets, alternative pellets (glume, energy crop, grain or rape straw) and other agricultural products (wheat, oats, rye, triticale, barley, corn, mustard, rape etc.).



# PLASTIC CONVEYORS SHAFTLESS AND COMPOSITE

To meet the requirements of an increasing number of new adhesive and abrasive materials and for applications which do not allow use of a shaftless screw due to the requirement for filling by transported material, we successfully provide **RATAJ®** rigid plastic screw conveyors (types **RP, RPN**) consisting of plastic segments forming the screw and the tubes. These components are simply installed on a hexagonal shaft and fixed with sophisticated locks and provide a very rigid bearing-free screw conveyor structure.

Such conveyors are used also for demanding applications to convey highly abrasive materials. Their main advantage is primarily their light structure and quiet operation. A plastic screw is several times lighter than a steel screw and when combined with corresponding plastic tubing the conveyors may be used in applications requiring continuous operation even without the conveyed material. The main areas of application are the food processing industry (adhesive and wet materials), chemical industry (aggressive substances) and, last but not least, also heavy industries, power industry and civil engineering. For the food sector, the segments are white and they are certified for contact with food, for abrasive materials, the segments are red, and for conveyors intended for use in potentially explosive atmospheres, the segments are grey.

## COMPOSITE SCREW CONVEYORS

Type	Outer screw diameter (mm) (±1 mm)	Pitch (mm) (±1 mm)	Hexagon (mm)	Capacity m <sup>3</sup> /hr *2/
<b>RP 50</b>	50,8	25, 50	13	0,001 – 0,5
<b>RP 80</b>	76,2	40, 80	17	0,001 – 1,0
<b>RP 100</b>	101,6	50, 100	22	0,01 – 5,0
<b>RP 150</b>	150	75, 150	32	1,0 – 15,0
<b>RP 220</b>	228,6	110, 220	32	3,0 – 50,0
<b>RP 300</b>	304,8	150, 300	50	5,0 – 100,0

Material design:

Screw: Type **RP** - composite plastic  
 red segments – for abrasive materials  
 white segments – for food  
 grey segments – for the environment with the risk of explosion – ATEX

Tubes: steel (according to the standard EN - S 235, S 355)  
 stainless steel (according to the standard ASTM - AISI 304, AISI 316), plastic PP

Depending on the type of material conveyed and specific site conditions, combinations of material designs may sometimes be used.

\*2/ Transport performances of individual conveyors depend on the type and physical properties of the material conveyed.





# FEEDERS AND WEIGHING CONVEYORS FOR PRECISE DOSING

If it is necessary to dose the transported material in technological processes, we use dosing conveyors including a crown breaker. We manufacture dosing conveyors **in two versions**:

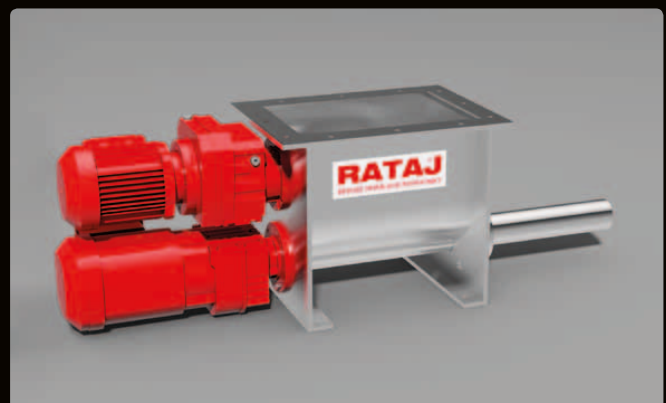
Simpler conveyor design is for **volumetric dosing**. The amount of material to be dosed is adjusted by means of a variable speed drive and the dosing process depends on the speed of the dosing conveyor spiral.

Dosing conveyors for **weight (gravimetric) dosing** control the dosing with the use of weighing tensiometers that adjust the required amount of dosed material in cooperation with the control system. The dosing accuracy is higher compared to volumetric dosing and the dosed (weighed) amount does not depend on the variable bulk density of the material.



Thus the weighing shaftless screw conveyor **RATAJ®** combines transport and weighing functions in a single system and achieves savings since there is no need to invest in a conveyor and dedicated scales. The electronic weighing system with four tensiometers allows precise monitoring of the amount of transported material. The amount of material weighed may vary from a few kilograms per hour up to several tons per hour.

The same conditions apply for the design of weighing shaftless screw conveyors as for the installation of standard shaftless screw conveyors.



# CONVEYORS FOR EXPLOSIVE ENVIRONMENT (ATEX)



Based on the technical requirements for equipment and protective systems designed for use in an environment with a danger of explosion, our shaftless screw conveyors have been tested and certified to comply with the requirements of the corresponding standards (21 and 22).

Special shaftless screw conveyors resistant to explosion up to the pressure of 1.0 MPa are designed for applications where explosive material may enter the conveyor causing explosion therein (such as burning fuel, hot ashes etc.).

The technical parameters of the shaftless screw conveyor designed for an environment with the danger of explosion (ATEX) are designed so that the conveyor itself cannot initiate an explosion.



RL 400 - Coal dust (Czech Republic)



RLNE 450 - Black / Brown coal (Czech Republic)

# CONVEYORS FOR BIOGAS STATIONS SPARE SPIRALS, SCREWS, TUBES AND GEAR UNITS



Many biogas stations have been built in the Czech Republic and Slovakia in recent years. Most of them use a system of material dosing to a fermentation tank with spiral or shaftless screw conveyors. Very often, methods of material transfer between individual conveyors are not appropriate and therefore biogas station users are forced to purchase expensive spare parts from abroad after a few years of operation. Based on our experience with thousands of conveyor applications we have developed a solution for biogas customers in the form of conversion of the most loaded transfer points and spare spirals or screws in the same dimensions. Our production portfolio for biogas stations includes gear units and tubes (round, hexagonal or screwed).

Another important aspect is the operation of spiral and shaftless screw conveyors in an environment with the risk of explosion. Conveyors operate in such an environment and therefore their design must comply with the relevant standard. Many times we find that the ATEX standard is not respected in biogas stations, often due to lack of knowledge or risky cost saving.

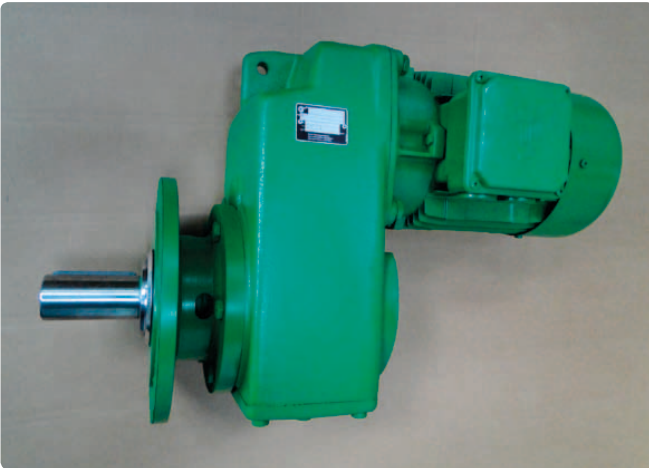
We can provide advice to biogas station operators within our technical inspection and solution design services.



## UNIQUE GEAR UNITS FOR SHAFTLESS SCREW CONVEYORS

Electric gear units are one of the key elements of our shaftless screw conveyors. Their designs include helical, worm, helical bevel and flat gear units based on individual site conditions. We use flat and worm gear units of the SCP type with an inserted adapter protecting the gear unit from being polluted by the material conveyed in the case of conveying dusty and abrasive materials and materials at high temperatures. These unique gear units also ensure the separation of oil filling from the internal space of the conveyor. We have worked with the gear unit manufacturer Getriebebau NORD on the development of this solution.

We supply stainless steel gear units for use in food and chemical production plants consisting of stainless steel stator and gear unit body. This design is especially convenient when conveying aggressive materials. In the case that the conveyor is intended for use in environments with explosion hazard, we supply gear units of the ATEX design.



# BIG BAG STATIONS FOR BIG BAG FILLING AND EMPTYING

Filling bulk materials to large capacity bags (BIG BAG) and emptying using **RATAJ**® shaftless screw conveyors allows dust-free and effective work with bulk materials for the users.

Each **RATAJ**® BIG BAG station is designed specifically for the purposes of the customer and therefore many alternative BIG BAG stations can be provided for various dimensions, weights and bag types (standard bags, bags with supporting structure, conical bags and others). Bags with both flat and conical bottom, with a discharge valve and other types can be used for the BIG BAG emptying stations. Bags with both flat and conical bottom, with a discharge valve and other types can be used for the BIG BAG emptying stations.



The BIG BAG emptying stations include a suspension cross frame for the bags allowing loading on a forklift or attachment to a remotely controlled block pulley. Optional accessories include lifting platforms with pneumatic drive facilitating material discharge from the bags, bag closing iris valves, suspension systems for various bag heights and weighing tensiometers including an electronic evaluation unit for bag filling. BIG BAG stations are manufactured from steel or stainless steel (AISI 304 or AISI 316). The stations are surface treated with baking powder coating according to the RAL colour range or by galvanizing.



# TEST CONVEYORS AND BIG BAG STATIONS

Despite much experience with the transport of hundreds of types of different materials, new kinds of transported materials with various physical properties keep emerging. All of our customers have the opportunity to test their materials on our test conveyors. We prepare our test conveyors for the specific application and adjust the parameters of future conveyors together with the customer in our demonstration and testing centre.

We have also a fully equipped **BIG BAG emptying station** with emptying conveyors available. This station is designed to allow demonstration of maximum possible accessories (block pulley, lifting platforms with pneumatic drive, several types of suspension crosses and various adapters for different heights of BIG BAGs). For BIG BAG filling, we have a testing **BIG BAG filling station** with scales and a control unit for connection to the control system.

As a result, we are able to demonstrate and test emptying and filling of original size BIG BAGs as well as material transport by our shaftless screw conveyors for the customer's convenience in full functionality of our technology under their site conditions.



# TUBES

## STEEL, STAINLESS STEEL, PLASTIC, CAST BASALT OR ALLOY

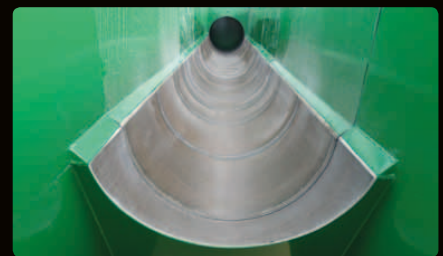
Based on our long-term experience we supply steel, stainless steel or plastic (PP, PVC, PA, POM, PE) tubes for the transport of abrasive and adhesive materials. Steel or stainless steel tubes with basalt or alloy inserts are used for the transport of extremely abrasive materials.

**Polypropylene** with its special properties shows better abrasion resistance in some cases compared to standard steel pipelines. The low weight of the tubes allows producing the conveyor in longer assembly pieces and the use of flange connections significantly accelerates the conveyor installation. In addition, we manufacture polypropylene hoppers and discharges.

**Polyamide** is used for the transport of adhesive materials. These inserts sold under the trade name **RATAMID**® are made on a PA 6 polyamide basis and show several times better properties in tensile strength, tenacity, abrasion and mechanical stress than standard steel tubes. The temperature of conveyed materials with the use of the plastic insert can be up to 140 °C. These conveyors have a wide range of applications in the food processing industry because the plastic inserts are tested for contact with foodstuffs.

**Basalt** is used for the transport of abrasive materials or for conveyors which operate also without material. The 20 mm thick basalt inserts are of through or circular design. The main applications include mainly power and mining industry for the transport of ash, slag, coal and other abrasive materials.

The **RATABEN**® alloy provides the best abrasion-resistant properties from the whole portfolio of tubes/inserts that we use. These alloy inserts are used for the transport of extremely abrasive and hard materials, such as fly ash, glass, corundum, grog, crushed basalt, blasting materials, and in any applications with a requirement for a longer service life of the system. Individual alloy inserts are manufactured to fit the specific tubes; we can also produce flat alloy plates as a lining for the flat surfaces of storage bins and hoppers.



## RATAJ® SCREW PUMPS FROM HISTORY TO RECENT DEVELOPMENTS

The more than 2300 year old invention of Archimedes' screw for conveying water, sewage, sludge and other liquids is still an important part of wastewater treatment plants and operations where it is not technically possible to use any other method of conveying liquids and sludge.

Thanks to our latest technical solution of screw bearings, our screw pumps are able to work "underwater" without the use of a conventional bearing and above all without the need for lubrication. Therefore, the screw pump user does not have to install and operate a pressure lubrication system! This technical solution ensures maintenance-free and environmentally friendly operation of the bottom bearing of the screw.





RL 300 - Gypsum (Czech Republic)



RLP 200 - Sludge (Czech Republic)



RLN 180 - Nealit (Czech Republic)

## SHAFTLESS SCREW COOLER RATAJ a.s. PATENT

Based on our own development we have managed to create a shaftless screw cooler working on the principle of a rotating shaftless screw without the use of bearings. This very simple, patent-protected cooler principle allows for cooling material of temperatures up to 800°C. The design of the cooler enables a serial arrangement of several cooling conveyors resulting in very effective cooling of material in a small space. The shaftless screw cooler has been designed in both vertical and inclined versions and transport of cooled material to other technology may also be performed together with its main cooling function. The cooling medium is usually water or modified water solutions.

**RATAJ®** coolers are either steel or stainless depending on the temperature of the input material to be cooled. The cooler includes a control unit for regulation of the transported amount of cooled material and collection of data on input and output temperatures of cooled material. Large variability in shaftless screw diameters allows cooling materials such as slag, cinder, ballast ash, fly ash, gravel, chemical and food industry side products and many others. The cooler capacity is influenced by many parameters of the cooled product and each cooler is designed in the same way as the shaftless screw conveyors - "custom made" according to the individual process conditions. We can achieve output from several kilograms up to several tens of tons of cooled material per hour based on the cooled material and the cooling medium.



# VERSATILITY IN MANY INDUSTRIES

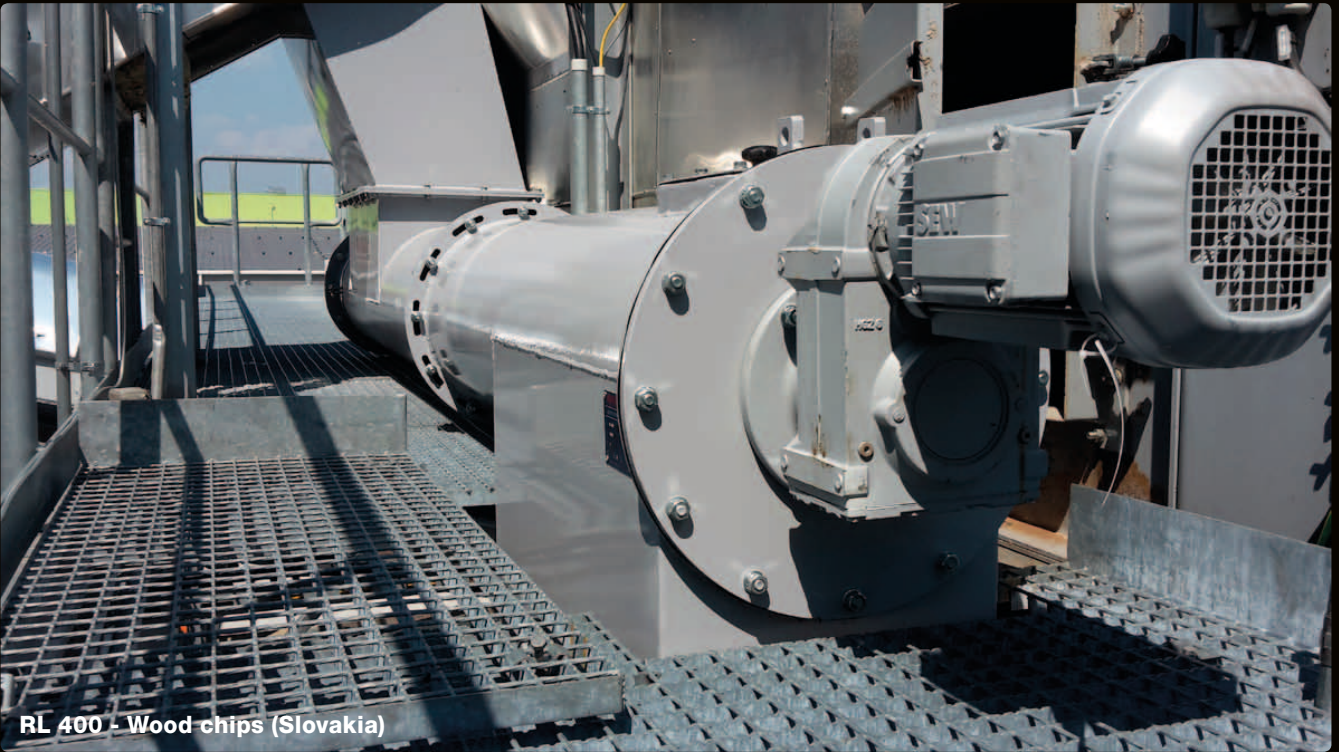
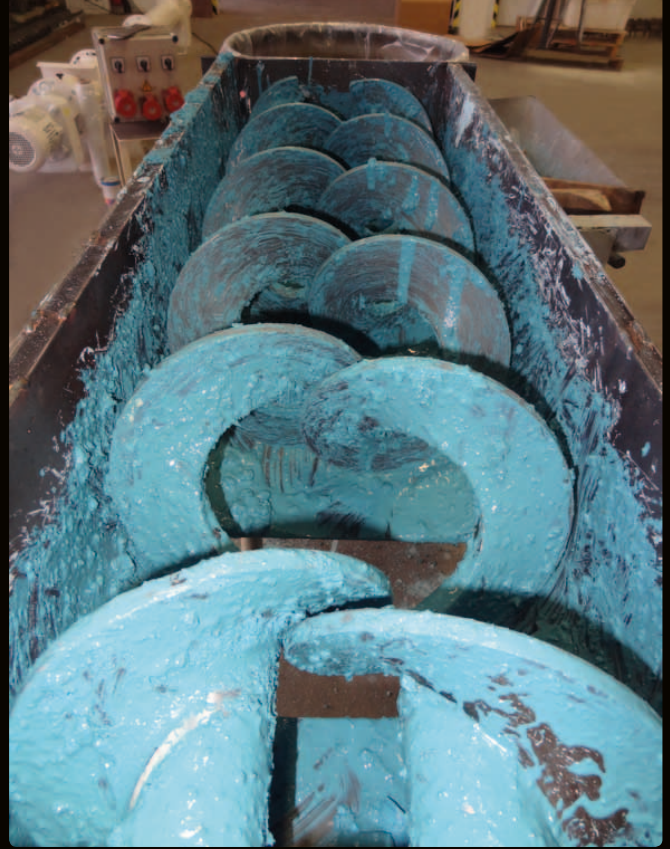
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<b>AUTOMOTIVE INDUSTRY</b>	(rubber granulate, abrasion dust).
<b>WOODWORKING INDUSTRY</b>	(wood dust, veneer, parings, bark, pellets, sawdust, chips).
<b>ECOLOGY</b>	(water treatment plant sludge, filter cartridges, crushed marble, dust-offs).
<b>POWER GENERATION</b>	(coal tar, energy gypsum, lignite and pit-coal, coke, coke and coal dust, ash, fly ash, petroleum waste, soot, cinder, dross).
<b>PHARMACEUTICAL INDUSTRY</b>	(penicillin, baby powder).
<b>CHEMICAL INDUSTRY</b>	(activated carbon, dyes, borax, black manganese, bisphenol A, fertilizers, chloramine, alum, catalysts, rubber, cyanide, acids, ice, saltpetre, caustic soda, magnesite, urea, sulphur, petroleum waste, ammonium sulphate, aluminium sulphate, soda, titanium white, putties, zeolite).
<b>NUCLEAR INDUSTRY</b>	(activated coal, radioactive ionex, uranium dust).
<b>LIGHT INDUSTRY</b>	(abrasives, borax, cellulose, charcoal, rubber granulate, graphite, aluminium blinds, chemlon thread, chalk, mineral wool, urea, paper, tyres, polystyrene, wash powders, silica, glass, glass fibre, textile fibres and shears, hayseed, soil).
<b>MARINE INDUSTRY</b>	(agricultural commodities).
<b>PLASTICS INDUSTRY</b>	(ABS, PE, PP, PA, PET sheets, PVC granulates, polystyrene).
<b>FOOD INDUSTRY</b>	(peanuts, potato chips, cappuccino, chickpea, sugar, tea, lentils, chocolate mass, glucose, mustard, cocoa, coffee, spice, lactose, gluten, grains, flour, muesli, peppers, fruit stones, pastry, custard, raisins, fish, rape, rice, malt, sweeteners, cream, breadcrumbs, dried milk, salt, whey, starch, tobacco, curd cheese, pasta, eggshells, dried vegetable mixtures, frozen vegetables).
<b>RECYCLING</b>	(electrical waste, crushed cables, scrap steel, PET bottles, tyres, textiles).
<b>HEAVY INDUSTRY, MINING</b>	(bentonite, crushed glass, aluminium granulate, carbide dust, corundum grit, cast iron and steel splinters, cast iron and steel marbles, magnesite, manganese ore, nickel, cinder, glass batch, glass, heavy metals).
<b>CONSTRUCTION</b>	(agglomeration dust, red clay, asphalt granulate, shale, cellulose, cement, dolomite, clay, kaolin, diatomaceous earth, perlite, sand, plaster, gravel, fireclay, lime, lime sludge, spar, granite grit).
<b>AGRICULTURE</b>	(biomass, potatoes, feed for salmon at sea farms, feed mixtures, corn, legumes, poppy seeds, meat and bone meal, cereals, fruit, colza, straw, soy, pollard, hayseed, vegetables, cabbage).



RL 400 - Black coal (Poland)





RL 400 - Wood chips (Slovakia)



RP 230 - Dian (Poland)



SLP 68 - Grain (Czech Republic)

# RATAJ® CONVEYORS

## WORK THROUGHOUT THE WORLD

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**RATAJ®** has manufactured and installed over 5,000 conveyors for application in most industries. These applications include emptying and filling of containers, hoppers, and Big Bags, transport of material between processes, filling and emptying of cars, dosing, and transport into homogenizers, packaging machines, crushers, sorters, mills, boilers, and many other applications.

Our long-term experience with material transport using shaftless screw conveyors for more than 550 different types of materials conveyed gives our customers a guarantee of optimum and technically advanced design for loose material transport.

Our customers are significant international, European, Czech, Slovak and Polish companies. By the end of 2019 we will have supplied our conveyors to 48 countries on four continents:

**EUROPE:** Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Iceland, Latvia, Lithuania, Hungary, Moldova, Montenegro, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, Ukraine.

**AFRICA:** Algeria, Egypt.

**AMERICA:** Chile, Canada, United States of America, Venezuela.

**ASIA:** Armenia, Bahrain, Japan, Kazakhstan, Mongolia, Saudi Arabia, United Arab Emirates, Tajikistan, Turkmenistan.



The most important service we can offer to our Customers is our “know-how”. Our constant development and installation of new, still untried types of materials with the assistance of our customers allow us to stay ahead in the technology of screw conveyors.

All our customers, regardless of size, give us information and experience from the operation of our shaftless screw conveyors that we further use for the transport of new and difficult to transport materials under unique technological conditions.

We have installed test conveyors on our manufacturing and warehouse premises for your convenience to test conveying of your material with a selection of more than 220 types of shaftless screws in the total length exceeding 8000 m and accessories for shaftless screw conveyors.



RL 150 - Wood chips (Belarus)



RL 220 - Cement (Czech Republic)



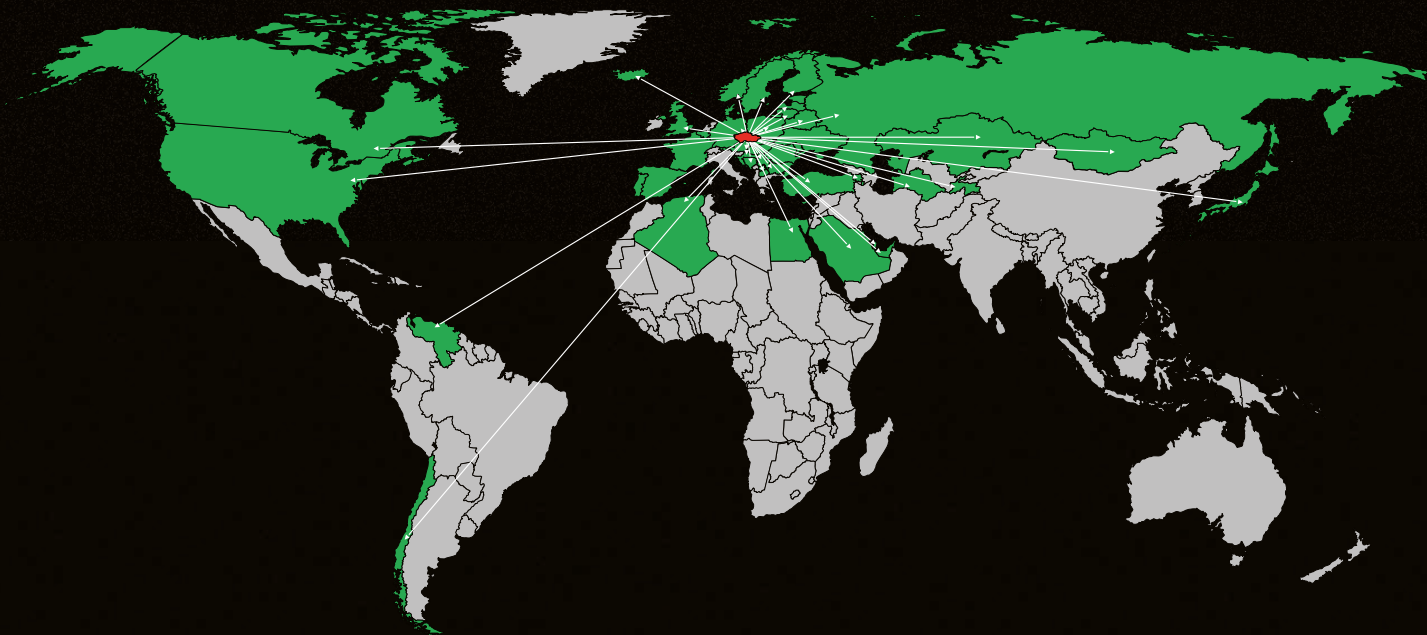
RLN 150 - Graphite (Czech Republic)



RL 315 - Wood chips (Belgium)



RL 100 - Lime (Czech Republic)



A reference list of installed conveyors, our customers, and types of conveyors can be found on our website.

[www.rataj.cz](http://www.rataj.cz)



Rataj references



Rataj on YouTube



Rataj on the map



<https://map.what3words.com/salaried.plights.every>

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