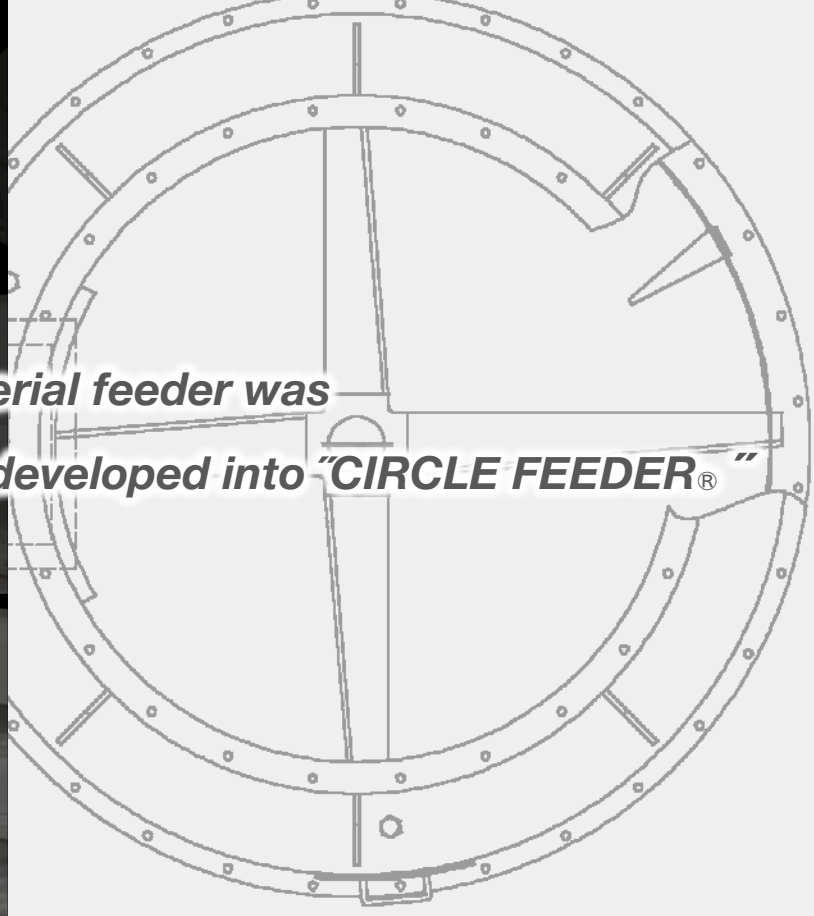
Powder & Granular Material Feeder by YOSHIKAWA

CIRCLE FEEDER®

Comprehensive catalog

PAT.

Powder & Granular Material Feeder by YOSHIKAWA



Powder and granular material feeder was developed into "CIRCLE FEEDER® "

Bridging and segregation of materials are prevented.

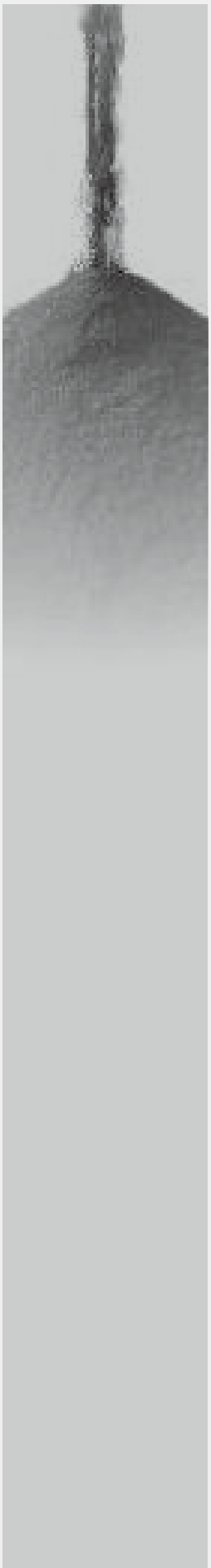
Mass flow and uniform-rate feeding are realized.

Energy saving by low power.

Contents

CIRCLE FEEDER® CF

Sister products



CIRCLE FEEDER® CF

Powder & Granular Material Feeder

Principles of the Discharge System and Construction Drawing

Adjustment of Discharge Rate

Specification list

CIRCLE FEEDER® solves every problem with powder and granular materials once and for all.

Construction

Construction and Principles of the Discharge System

- CIRCLE FEEDER is to be attached to the bottom of a hopper or silo.
- On the bottom panel of the CIRCLE FEEDER, thin, flat vanes rotate.
- The vanes spread out and move the powder materials to the periphery of the cylinder.
- At the periphery, the powder materials are introduced to the exhaust port by peripheral vanes and discharged.

① Hopper ② Flow adjustment bolt ③ CIRCLE FEEDER ④ Motor

Adjustment of Discharge Rate

- Clearance Adjustment of Flow Adjusting Ring (Standard)
  The feed rate is controlled with raising and lowering the height of flow adjusting bolts on the casing by turning the flow adjusting bolts.
- Rotation Speed Adjustment of Rotary vanes(Optional)
  Increases the discharging rate and lower r.p.m. decreases it.
  Mechanical type (Beier Variator Disco,etc.)
  Electrial type (Inverter, etc.)

Specification

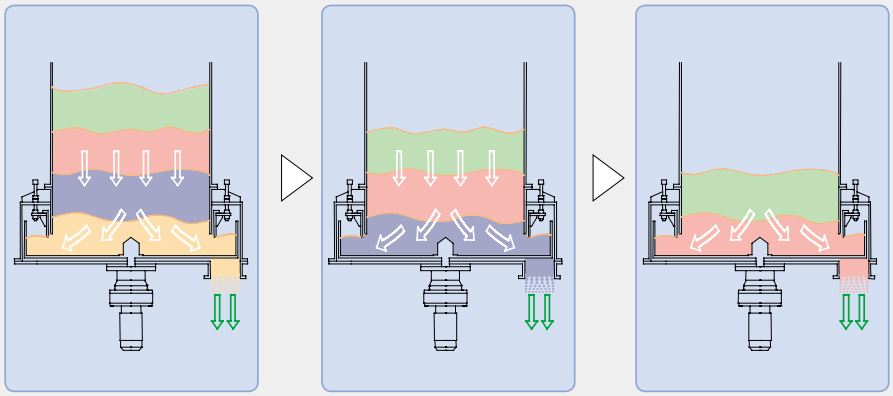
Item \ Model		CF-200		CF-300		CF-500		CF-700		CF-1000		CF-1200		CF-1400		CF-1600		CF-1800		CF-2000		CF-2400	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Max. Capability (m3/h)	50Hz	0.13	0.66	0.38	0.89	0.92	2.4	4.9	13	10	20	13	29	18	35	20	38	27	48	30	59	40	86
	60Hz	0.15	0.80	0.46	1.1	1.1	2.9	5.9	15	12	24	16	35	22	42	24	46	32	58	36	71	48	104
Min. Capability (m3/h)	50Hz	0.05	0.37	0.21	0.49	0.51	1.1	1.9	5.6	3.2	7.4	3.9	9.1	5.3	14	5.9	15	6.8	17	8.6	18	11	32
	60Hz	0.06	0.44	0.26	0.59	0.62	1.3	2.3	6.8	3.9	8.9	4.8	11	6.4	16	7.1	18	8.2	20	10	22	13	38

- Specifications may vary in accordance with the characteristics of the powder material.
- One exhaust port is provided as a standard feature. (Additional ports can be attached as required, e.g. two ports.)
- Additionally, special specification models are also available.
  - Standard materials: carbon steel400, and SS304
    Optional materials : SS316,316L, titanium, hastelloy, resin-coating,and etc
  - Watertight construction
  - Airtight 490.3kPa (5kg/cm2) for example.
  - Heat-resistant specifications (700℃ of powder material temperature, etc.)
  - Wear-resistant specifications (rotary vanes, etc.) and many more.
  - Explosion-proof specifications (eG3,d2G4)
  - Sanitary specifications.
  - Revolution speed control optionally by Beier, disco, or inverter.
- CF-200 with revolution speed control unit as a standard.
- Large-sized Circle Feeder
  Equipment larger than CF-2400 is also available.
  Inquiries are invited.

1 Mass flow

What is Mass flow?

- Mass flow is the movement where the entire powder and granular material in a storage tank flow in streams to be smoothly discharged.
  The Circle Feeder enables Mass flow (first-in first-out) as it allows the powder and granular material to flow radially toward the periphery where it is discharged.



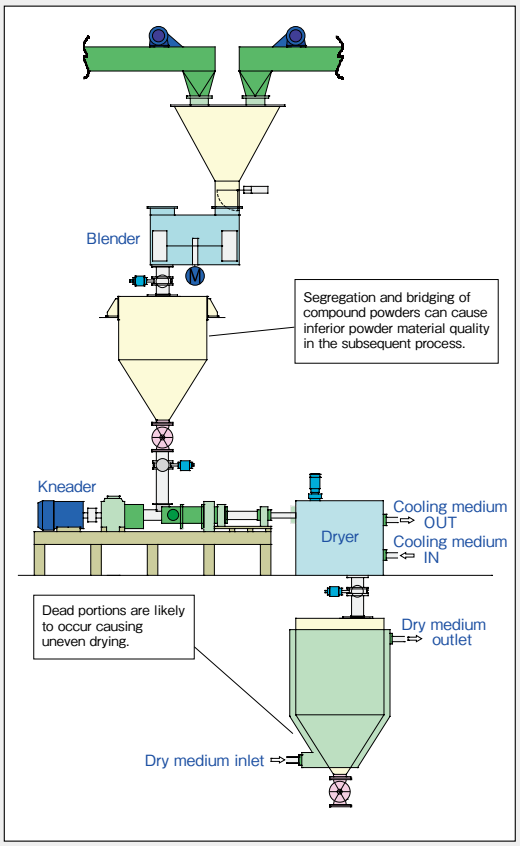
What is Segregation?

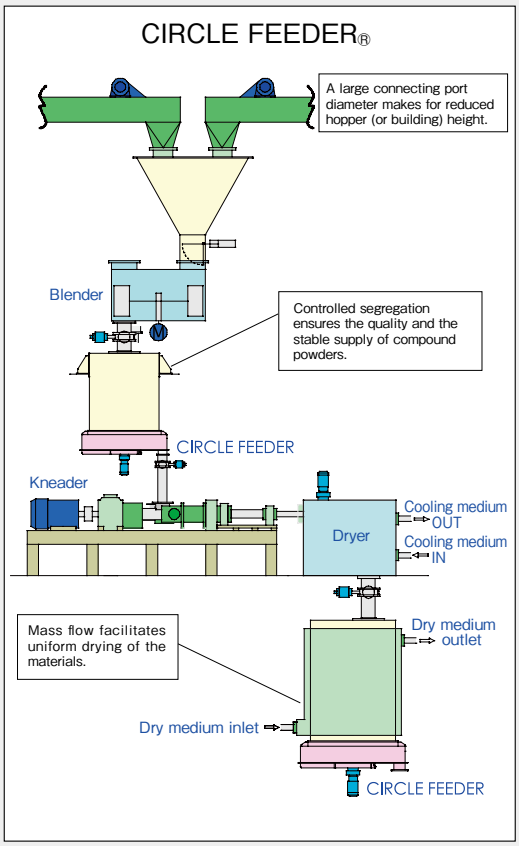
- Segregation is the uneven distribution of components in a powder or granular material that occurs during flows of the material due to differences in physical properties of its components. The Mass flow mechanism of the Circle Feeder prevents segregation of powder and granular materials.

2 Segregation improvement case

Segregation deterrence

- Segregation is difficult to check visually, and the adverse effects resulting from segregation during storage and handling of powder and granular materials are diverse.
  For the pharmaceutical and food industries, in particular, segregation is a significant factor in lowered product quality.
  The Circle Feeder is the one and only feeder in the world that can prevent segregation via Mass flow discharging.
  Employment of the Circle Feeder will prevent segregation and help improve the stability of product quality.





Mixing process

By controlling segregation, the compound ratio can be kept constant, and thereby quality degradation can be prevented.

Drying process

Mass flow of materials maintains the constant drying time and realizes the uniform material quality. Consistency in materials can be achieved even during the heating or cooling process.

Storing process

Segregation and bridging of materials do not easily occur even after a long storage period, whereby stable discharging can be realized.

1 Special specification

Sanitary Specification Models

Hand truck type

Manual lift type

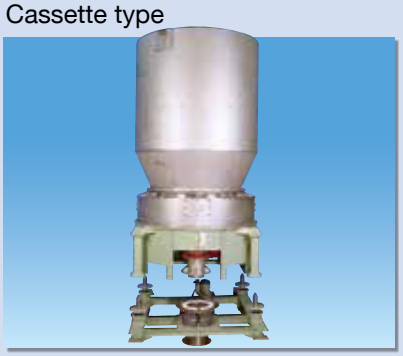
Electric lift type

Special Specification Models

Heat resistant type

Pressure-resistant type

Cassette type



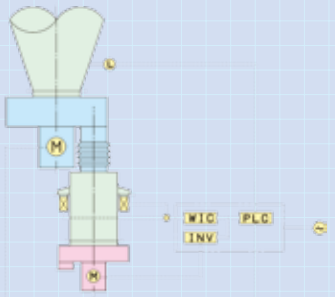
2 Measuring system

Composite Examples

Simple Measuring Unit

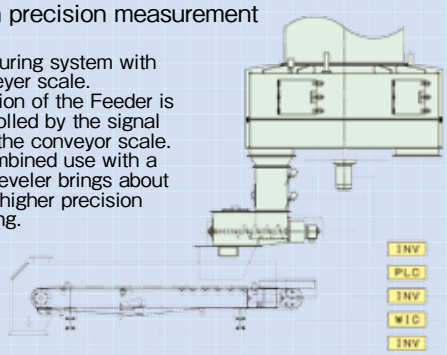
The loss-in-weight system combined with a load cell and the batch-weighing system offer high-precision measurement and feeding. Compound measuring units in combination with a high-mix low-volume measuring & packaging device or multiple feeders can also be constructed.

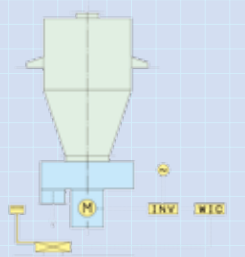
Continuous Uniform-Rate Feeding



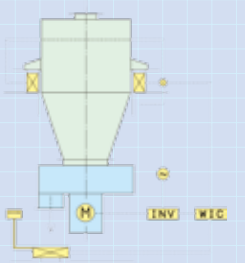
High precision measurement

Measuring system with conveyer scale.
Rotation of the Feeder is controlled by the signal from the conveyor scale.
A combined use with a flow leveler brings about even higher precision feeding.





Measurement at Supply



Measurement at Discharge

CF−Σ
Circle Feeder Sigma

High accuracy is achieved with a combination of a Circle Feeder and a unique volumetric feeder.

Feature

Discharger, Circle Feeder, prevents bridging with stable feeding.

Its unique mechanism realizes highly accurate and uniform-rate feeding.

More than one down-stream is possible with additional discharge ports, each with a different and accurate feed rate.

Easy cleaning and maintenance.

Blade type / Disc type (The both types are available)

Specification table

◆Secondary

Model	a	b	c	d	e	f	g	h
Feeding capability	10～60 (ℓ/h)	20～120 (ℓ/h)	40～250 (ℓ/h)	80～500 (ℓ/h)	0.15～1.0 (m^3/h)	0.4～2.5 (m^3/h)	0.85～5.0 (m^3/h)	2.0～10.0 (m^3/h)
Power supply	Three-phase AC200/220V 50/60Hz							

◆Primary

Model	Σ-300	Σ-500	Σ-700	Σ-1000
Corresponding feeders	a～g	a～g	a～h	b～h
Number of discharge ports	1 or 2 ports			
Power supply	Three-phase AC200/220V 50/60Hz			
Approximate weight (kg)	275	345	480	610

LF
Loop Feeder

Stable feeding the string materials that are likely to twine around.

Feature

Stable supply of industrial waste and other amorphous material.

Bridging and segregation of materials are prevented.

Mass flow and uniform-rate feeding are realized.

Specification table

Model	LF-1600	LF-2000	LF-2400	LF-3000	LF-3600
Feeding capability	0.5m^3/h ～ 100m^3/h By adjusting the inverter from 6 to 60 Hz, a 1-10 control range of the feeding capability is possible.				
Power supply	Three-Phase AC 200/220V 50/60Hz				
Approximate weight (kg)	2000	3000	4000	7000	9000

DS
Disc Feeder

High accuracy is possible with less breakup and stable quality.

Feature

Stable quality with no breakup and segregation.

Reduced the loss of product material of the almost non residual material.

Handle a wide variety of powder, granular, and lump.

No pulsation with high accuracy.

Specification table

Model	Capability (m^3/h)	Approximate weight (kg)
DS-300	0.6～1.6	110
DS-500	1.1～3.3	280
DS-700	2.7～8	540
DS-1000	5～15	1070
DS-1200	7～21	1390
DS-1400	10～30	2070
DS-1600	13～39	2540
DS-1800	17～50	3350
DS-2000	23～67	4200

CS
Sanitary Type

For pharmaceutical and food industry.

Feature

Stable feeding of hard-to-feed materials.
Mass flow and uniform-rate feeding are realized.
Prevention of bridging and segregation.
Easy to disassemble and assemble.
No packings used.

Specification table

Model	CS-300	CS-500	CS-700
Feeding capability (ℓ / h)	96 ~ 960	228 ~ 2280	562 ~ 5620
Power	Three-Phase AC200/220V 50/60Hz		
Materials	SUS304(Powder-contacting section: Buff #400, Outer surface: Buff #300)		
Approximate weight (kg)	140	270	400

CFD
CFD Type

Dust collector of Circle Feeder type.

Feature

CFD, utilizing the feeding principle of the Circle Feeder, has a bridging preventing effect with a stable discharge of the collected dust. (Max. proven temperature 900 degrees Celsius with special specification units)

Standard specification	**N type**	Dust temperature: under 80℃
Heat-resistant and air-cooled specification	**HA type**	Dust temperature: under 250℃
Heat-resistant and water-cooled specification	**HW type**	Dust temperature: under 360℃

Specification table

Model	CFD-1000	CFD-1200	CFD-1400	CFD-1600		CFD-1800		CFD-2000		CFD-2200		CFD-2400	
	N	N	N	N	HA/HW	N	HA/HW	N	HA/HW	N	HA/HW	N	HA/HW
Designed feed rate (m³/h)	6.0	8.0	10.0	10.0		12.0		12.0		12.0		12.0	
Approximate weight (kg)	300	370	430	600	700	780	850	900	1050	1000	1150	1200	1350

PTC
Pneumatic Circle

Ejector installed! Highly accurate feeder for pneumatic conveying.

Feature

Small amount feeding and pneumatic conveying are possible.

Stable feeding with highly accurate structure.

No air leakage by applying ejector system.

Specification table

Model	Feed rate with 1 port					Number of port
	A	B	C	D	E	
PTC- 300(ℓ/h)	0.2~1.4	1.0~7.0	4.0~6.0	30~200	70~400	1~3
PTC- 500(ℓ/h)	0.2~1.4	1.0~7.0	4.0~6.0	30~200	70~400	1~4
PTC- 700(ℓ/h)	—	1.0~7.0	4.0~6.0	30~200	70~400	1~4
PTC-1000(ℓ/h)	—	—	4.0~6.0	30~200	70~400	1~4

CU
Container Unit

Container having feeding capability.

Feature

It permits storage and transportation of materials by container.

It is suitable for various kinds of high-mix, low-volume production.

It is designed to reduce labor.

Specification table

Model	CU 002	CU 05	CU 10	CU 15
Effective capacity	20L	0.5m³	1.0m³	1.5m³
Feeding capability	0.6m³/h	10m³/h		
Power supply	Single-Phase AC100/110V 50/60Hz	Three-phase AC200/220V 50/60Hz		
Approximate weight(kg)	45	500	750	950

YPD
YPD Series

Polymer Dissolution System.
(applicable to the other powder dissolution than polymer.)

Feature

The unique initial dissolution system achieves thorough dissolution of the flocculant.

Stable feeding is possible with applying chute of dew condensation prevention.

The lineup of standard N type and high-function P type.

Specification table

Model	YPD-05	YPD-10	YPD-20	YPD-30
Dissolver capacity	0.5 m³	1.0 m³	2.0 m³	3.0 m³
Dissolved oxygen concentration	0.1 ～ 0.2 wt%			
Hopper volume	50 L (option 70 ・ 90 L)			
Supply-water specification	Quantity of water supply : 20L / min Over ・ Pressure of water supply : 0.15 ～ 0.7MPa			
Supply-air specification	Air pressure ：0.4 ～ 0.7MPa			
Power supply	Three-Phase 50/60 Hz ・ AC200/220V			

MF
Mini Feeder

Powder and granular material and small size feeder.

Feature

Feeder that can feed, at a very low rate and small quantity, powder materials that are usually difficult to discharge.

Specification table

Model	MF-100	MF-150	MF-200	MF-250
Feeding capability (ml/min)	15 ～ 300	73 ～ 1466	80 ～ 1600	92 ～ 1833
Power supply	Single-phase AC100V / Three-phase AC 200V 50 / 60Hz			
Contact materials	Sus or aluminum , others			
Attachments	H Type：Speed Control Box ／ R Type：Inverter			
Optionnal parts	Hopper			
Weight (kg)	9.5	19.5	23.0	26.5

MD
Micro Discharger

High accuracy and small size feeder.

Feature

With the Circle Feeder principle applied, high-precision feeding is realized even for powders of poor fluidity.

A small amount of feeding with 1g/hr

Easy disassembly and cleaning

Specification table

Model	MD-125	MD-200
Capability (cc/min)	0.52 ~ 166.7	5.2 ~ 1667
Power supply	Single-Phase 100 / 200V 50 / 60Hz Three-Phase 200 / 220V 50 / 60Hz	
Option	Scraper	

DF
Delta

Compact, Uniform rate powder feeder.

Feature

Without using a scale, high precision of ± 0.5% was realized in widely ranged feeding rates, 1mℓ per minute at minimum.

Specification table

Model	DF-100
Capability	12 ~ 120 ml/min
Feed Accuracy	±0.5%
Contact Materials	SUS303
Power Source	Single-Phase 100V 50/60Hz
Motor Capacity	Speed Control Motor 25W

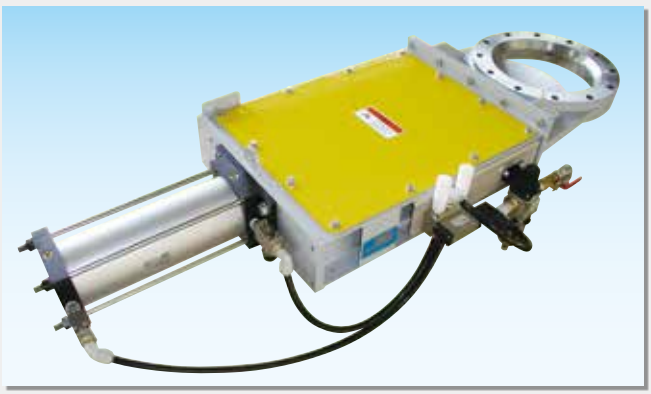
YG
Yoshikawa Gate

Slide gate for especially powder and granular.

Feature

Shut off the material by smooth performance.

Sealed with gland packing to protect powder leakage.



1. Application by powder property

	Powder					Flake		Lump	
	Flowability Large		Flowability Midium	Flowability Small		weak	strong	weak	strong
CF									
CF−Σ									
LF									
DS									
CS									
PTC									
CU									
CFD									
MD									
DF									
MF									

2. Powder reference list of Yoshikawa

Powdery Substance Examples (Applicability Proven)

- Chemical Substances
  Calcium carbonate, mixed fertilizer, charcoal, soda ash, sodium phosphate, soap powder, titanium oxide, dyes, potassium chloride, strontium carbonate, pigment, resin, dry sludge, chemical fiber, coke, coal, blast furnace slag, pulp sludge, etc.

- Food
  Corn starch, coffee grounds, steamed sweet potato, tea, flour, soy bean flour, starch dogtooth violet starch, oolong-tea, amino + dried bonito, ground hydrangea tea, etc.

- Feed
  Rice husk, wheat bran, bran, coconut pulp, rape seed pulp, soy bean residue, wheat germ, fish meal, fowl drippings, minced chicken/pork, etc.

- Others
  Adipic acid, alumina, antimony, sponge pulp, foundry sand, epoxy resin, mica, incineration ash, lump cellulose derivative, carbon black, impregnated pulp chip, oil coke, sawdust, sludge, etc.


pigment


silica・dehydrated cake


coke sludge


ceramic related powder


resin cake

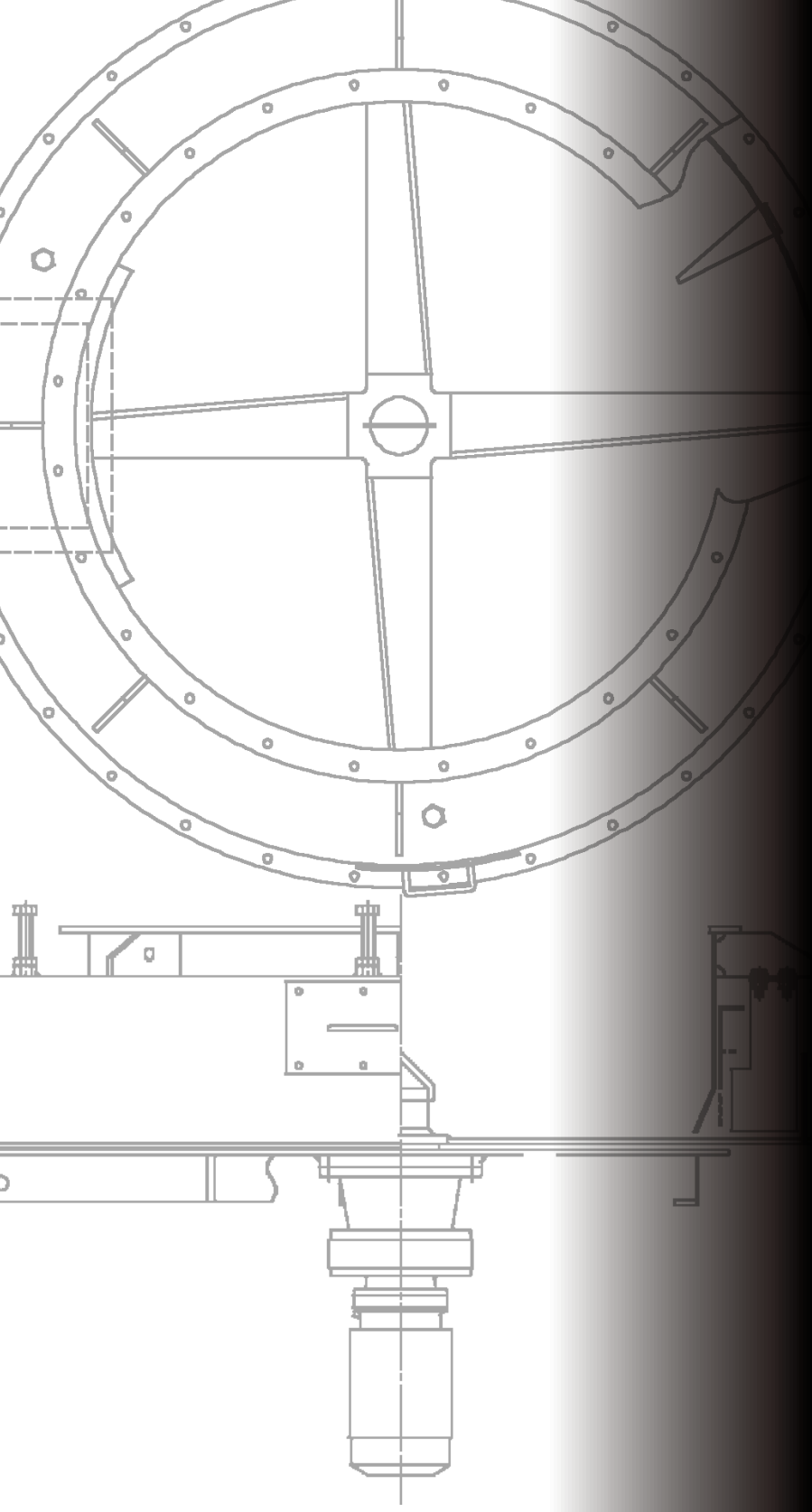

barley


plastic waste


tire chip


R P F


wood chip



CIRCLE FEEDER®

Ask for the test system.

- Confirm the performance of the CIRCLE FEEDER® in the test.
- Loss-in-weight and batching tests are available.
- Avoid the risk by testing with the product material.

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