

Environmental Fact Sheet

Elevator system Schindler 3100/3300/5300

Version 1.0
Released 2005-09-01



Schindler 

1. Organizational framework

1.1 Suppliers of main components

Machine

Leroy-Somer
Boulevard Marcelin-Leroy
FR-16015 Angoulême Cédex

Safety gear and overspeed governor

Schindler Drive System (SDS)
San Joaquin 15
ES-15013 Zaragoza

Car

Elevator Car System (ECS)
39, rue de Mulhouse
FR-68311 Illzach

Wertheim GmbH
Wienerbergstrasse 21-25
A-1100 Wien

Car decoration

Starcell
Via Sebenico 22
IT-20124 Milano

Metawell
Schleifmühlweg 31
DE-86633 Neuburg/Donau

Door System

Tecnolama s.a.
Ctra. Constaní km.3
ES-43206 Reus

Etablissements Henri Peignen S.A. (MEL)
269, rue du Marechal-Juin
Z.I. de Melun Vaux-le-Penil
FR-77015 Melun

Control, fixtures

Schindler Electronics Ltd. (LOC)
Via Della Pace 22
CH-6600 Locarno

Frequency converter

Vacon
Runsorintie 7
FI-65380 Vaasa

Traction media

Gates, GmbH
Eisenbahnweg 50
DE-52068 Aachen

Megadine
Via Trieste, 16
IT-10075 Mathi

Hoistway material (guide rails, counterweight, pit set, buffers, etc.)

Savera Elevator System Solutions
Akarregi Auzoa 22
ES-20120 Hernani Gipuzkoa

Wertheim GmbH
Wienerbergstrasse 21-25
A-1100 Wien

SIC-Lazaro S.A.R.L.
Rue de Yougoslavie, BP102
FR-71203 Le Creusot

SDS, ECS, MEL and LOC belong to Schindler **Industries**[®], the international engineering division of the Schindler Group, which consists of 5 main manufacturing sites located in Spain, France, and Switzerland.

1.2 Contact

Schindler Management Ltd.
Zugerstrasse 13
CH-6030 Ebikon / Lucerne
Switzerland

Contact person environmental fact sheet:
Sascha Iqbal, Environmental Management TS
Phone: ++41 41 445 3169
Fax: ++41 41 445 4548
E-Mail: sascha_iqbal@ch.schindler.com

1.3 Corporate business conduct

“Leadership Trough Service”: This vision of Schindler states a clear objective, leadership, and the means by which to achieve it, service. Our product is mobility (safe, reliable, comfortable, ecological and ever more efficient).

Every day, all over the world, 700 million people use Schindler elevators and escalators. Protecting the safety of the people who are transported by our products, or who work for Schindler, is of highest priority to our business conduct.

Schindler products are designed for a useful life of 15 to 30 years. Thus, Schindler’s main activity is not manufacturing products, but ensuring the mobility of their users with extremely high safety and availability of the installations. More than half of all employees (62%) are engaged in installation and maintenance at over 1000 locations around the globe, and less than 20% work in production.

1.4 Environmental management

Europe

The Corporate Function Area “Technology and Strategic Supply Management” (TS) operates an environmental management system (EMS). It is certified according to ISO 14001 since December 2000. The TS area covers Corporate Research & Development and Corporate Purchasing.

The manufacturing site Schindler Electronics Ltd. (LOC) operates an EMS which is certified according to ISO 14001 since November 2003.

North America

The manufacturing sites of Schindler Elevator Corporation in Gettysburg, Clinton (2 sites) and Sidney as well as Morristown headquarter and Holland Modernization Logistics Group operate an EMS which is certified according to ISO 14001 since March 2005.

Asia-Pacific

Schindler Lifts Ltd., Hong Kong, Schindler Singapore and Antah Schindler Malaysia Sdn. Bhd operate an ISO 14001 certified EMS.

1.5 Product description

Schindler 3100/3300/5300 is the product line for low-rise markets as a solution for new installation segments. It is positioned to cover the passenger market in residential buildings with basic to top requirements, and in commercial buildings with basic requirements.

Schindler 3100/3300/5300 is designed for operating without machine room (MRL – machine room less) and with flat belts (instead of conventional ropes) for transmission of traction.

1.6 Scope of application

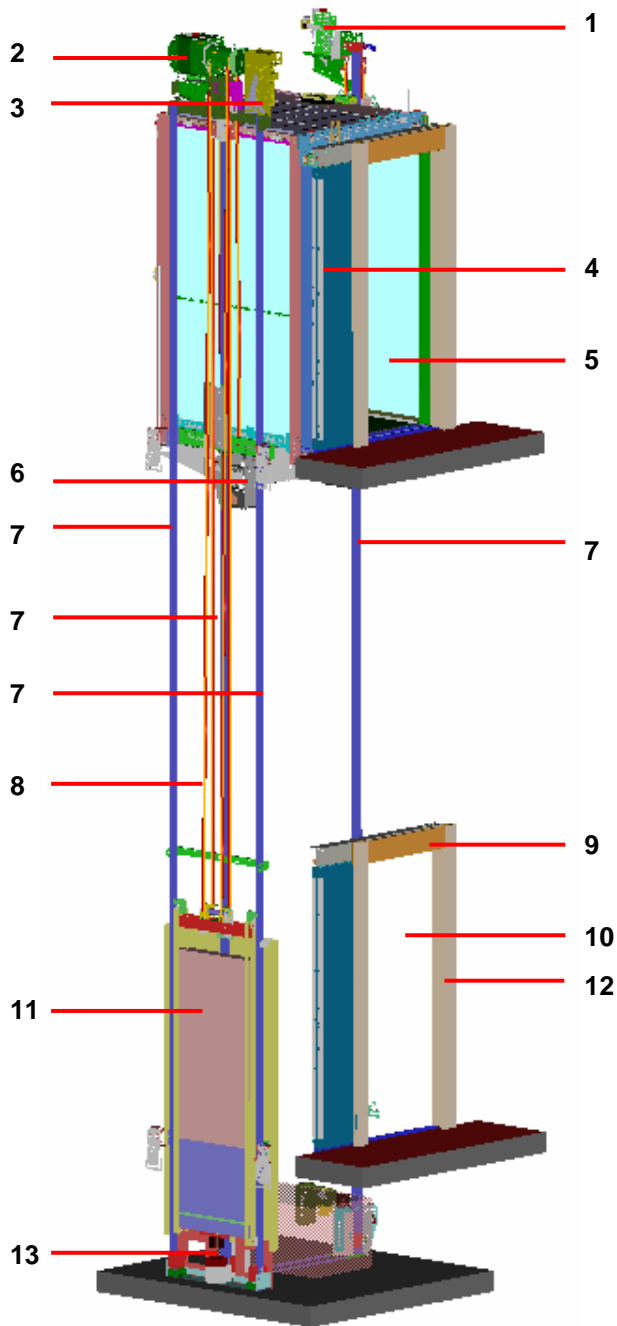
Rated load kg	Schindler		
	3100	3300	5300
400		X	
535	X	X	X
625	X	X	X
675	X	X	X
800			X
1000			X
1125		X	X

Rated speed 1.0 m/s,
0.6 m/s (Schindler 3100)
Max. travel height 30 m / 10 stops
15 m / 5 stops (Schindler 3100)
Max. trips per hour 90 (PI/DE), 120 (KA), 180 (KS)

Schindler 3100/3300/5300 elevator system may not be

- Designated as a firefighting elevator
- Applied in high-risk earthquake areas
- Used where explosion-protected employment is required
- Installed in wet environments

1.7 General product system overview



Pos.	Main component
1	Overspeed governor* (rope not shown)
2	Gearless machine w. motor brake*
3	Frequency converter
4	Control
5	Car
6	Safety gear*
7	Guide rails
8	Traction media
9	Door interlock*
10	Hoistway door
11	Counterweight
12	Fixtures
13	Buffer*

* safety component

2. Environmental performance

2.1 Life cycle assessment

In 1999 Schindler conducted a comprehensive life cycle assessment (LCA) of standard elevators in which all phases of their life cycle – development, raw material supply, manufacturing, packaging, transportation, installation, usage, maintenance, and disposal – were considered.

The LCA demonstrated that usage (electricity consumption), material supply and disposal (worst case scenario) are the life cycle phases of major relevance. Whereas the remaining ones - development, manufacturing, packaging, transportation, and installation - are of minor relevance.

The LCA study applied the rules of ISO 14040...43 and underwent a critical review by an external expert, independent of the LCA study. A summary of the study is available on request from the contact address given in chapter 1.2.

2.2 Functional unit

The validity of data presented in the following sections is restricted to the functional unit given below. It defines representative parameters regarding function, performance and configuration within the scope of application of Schindler 3100/3300/5300

- Useful system life* : 15 years
- Avg. trips per year* : 100'000
- Avg. operation time per trip : 7.2 s
- Avg. starts per hour : 20
- Avg. percentage of time elevator is running (brake lifted) during business hours : 5%
- Rated load : 535 kg
- Rated speed : 1.0 m/s
- Travel height : 12 m
- Number of stops : 5
- Reeving factor : 2 to 1
- Car lighting 2 x 14 W fluorescent tubes, activation mode "automatic off"
- Door dimensions (width x height) 800 x 2000 mm, telescopic opening, 1 access side
- Painted door finish
- Car dimensions (width x depth) 1050 x 1300 mm
- Traction media: poly-V shaped flat belts with steel cords
- Typical traffic pattern matrix (not shown)

* majority of installation will have lower number of trips per year and thus a higher useful system life.

2.3 System boundary

For each subsystem materials used and energy consumed during usage are assessed for the stated useful system life, and consolidated on system level. Based on the life cycle assessment results

(see chapter 2.1) only phases of major relevance (material supply and usage phase) are assessed.

2.4 Material supply

The following consolidated amounts of materials are used in the defined product system:

Material	System as installed [kg]	Replacement material ¹ [kg]
Non-alloyed steel	1'781	14
Low-alloyed steel	66	5
High-alloyed steel	57	0
Galvanized steel	225	10
Aluminum	29	1
Cast iron	54	0
Copper	23	0
Electronic & electrical compounds ²	9	1
Electro-technical compounds for power ³	1	0
Printed circuit boards (non-power)	2.3	0.3
Lead ⁴	1	2
Others ⁵	252	1
Total	2'500	33

¹ Estimated replacement material in 15 years

² E.g. relays, switches, contactors, fuses

³ E.g. inverters

⁴ Emergency power supply accumulator

⁵ Mainly concrete, glass, wood, and various plastics

2.5 Usage phase

The electricity consumption of the various subsystems is assigned to the categories "Operation" (energy mainly consumed while the elevator is performing a trip) and "Stand-by" (energy mainly consumed while the elevator stands still, waiting for a call) according to the table shown below:

Subsystem	Component	Operation	Stand-by
Drive	Machine	X	
	Fans		X
	Shaft losses	X	
Control system	Control & fixtures	X	X
Converter	Converter	X	X
	Fans		X
Car	Car lighting		X
Door system	Door drive	X	X
	Light curtain		X

Electricity consumption is mainly based on calculations. The consolidated values on system level for active energy consumption (qualitative information on reactive energy is given in chapter 3.3) are given below for the useful system life and per annum:

System electricity consumption in 15 years	
Operation [kWh]	6'097
Stand-by [kWh]	7'741
Total [kWh]	13'839

System electricity consumption per annum	
Operation [kWh]	407
Stand-by [kWh]	516
Total [kWh]	923

2.6 Impact assessment

The environmental impact related to material supply and usage is calculated using specialized LCA software with standard eco-inventories for materials and electricity supply.

Impact assessment includes the potential environmental impact generated by upstream processes such as mining of ores, electricity production, transmission and distribution, as well as downstream processes such as infrastructure and energy requirements for disposal.

Impact of usage phase is calculated based on UCTE electricity supply mix for low voltage. Impact assessment for other available electricity mixes is available on request.

Impact category	Unit	Material supply ¹	Usage phase ²	Ratio usage/material
Global warming potential	[kg CO ₂ -eq.]	3'505	7'360	2.1
Acidification potential	[kg SO ₂ -eq.]	43.9	38.8	0.9
Ozone formation potential	[kg Ethene-eq.]	11.8	11.5	1.0
Eutrophication potential	[kg PO ₄ -eq.]	4.9	2.1	0.4
Ozone depletion potential	[kg CFC11-eq.]	0.00018	0.00015	0.8

¹ Materials as installed plus estimated replacement material for useful system life

² Operation and stand-by electricity consumption during useful system life (UCTE electricity mix low voltage)

3. Additional qualifying factors

3.1 Halogen-free electrical cables

Halogen-free cabling (traveling cables, machine wiring and hoistway wiring) is available on demand as a non-pre-engineered solution.

3.2 Car lighting

The car lighting activation mode "automatic off" is installed as a standard solution for energy saving reasons. In this mode the car lighting is switched off after a default after-run time when the elevator is not in use.

Compared to the activation mode "always on", this substantially decreases stand-by energy consumption.

3.3 Drive system

The gearless ACVF closed loop drive system used in Schindler 3100/3300/5300 shows an improvement of active energy consumption during operation of approx. 16% compared to a geared ACVF open loop and of approx. 40% compared to a two-speed geared drive system, both used in preceding products (calculation based on functional unit defined in chapter 2.2.).

The gearless machine needs no oil for lubrication compared to geared machines used in preceding products.

Power factor (quotient from active and apparent power) is ≥ 0.92 .

Total harmonic distortion (quotient from total energy output signal and energy input signal) is $\leq 35\%$.

The Schindler 3100 traction elevator is an ideal alternative to hydraulic systems, because it uses considerably less energy and emits no odours.

3.4 Recycling and disposal

The product system consists of a high proportion of metals (different types of steel, cast iron, aluminum, and copper make up over 85% of total weight) suitable for recycling. Fluorescent tubes (car lighting), and emergency power supply accumulator contain hazardous heavy metals and have to be removed before dismantling the installation and properly disposed off.

Please refer to the guidelines for disposal attached to the annex of this document. They are also part of the Owner Documentation delivered together with every Schindler 3100/3300/5300.

3.5 Recycled content

Ferrous and non-ferrous metals used in the product contain the following estimated average post-consumer and post-industrial recycled content:

Metal/Alloy	Approx. scrap content	
	% Post-consumer	% Post-industrial
Aluminum	10	22
Non-alloyed steel	45	
Low-alloyed steel	45	
High-alloyed steel	15	
Cast iron	35	
Copper	22	22

3.6 Noise levels

Airborne noise in adjacent rooms [dB(A)]	
$L_{pAmax}^{2)}$	30 (incl. impulse noise)

Airborne noise on landings [dB(A)]	
$L_{pAmax}^{2)}$	60 (door noise)
$L_{pAmax}^{2)}$	55 (impulse noise at top floor)

Airborne noise inside car [dB(A)]	
$L_{pAeq}^{1)}$	50 \pm 3
$L_{pAmax}^{2)}$	57 (impulse noise)

¹⁾ L_{pAeq} : A-weighted equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.

²⁾ L_{pAmax} : Maximum A-weighted sound pressure level

3.7 Internal document control

Internal document no.: QP04017

Action	Name	Dept.	Date
Prepared	S. Iqbal	QP	19-Aug-05
Reviewed	E. Bütler	R&D-PLM	19-Aug-05
Released	G. Begle	PLM-COM	01-Sep-05

3.8 References

- Ökobilanzierung ausgewählter Standardaufzüge (LCA of standard elevators) SQ 99038
- Product Eco-Performance Improvement Table (System-PEcoPIT) for S001 Rel. 3
- Ride Quality Specification 890.2002.163B01
- Schindler 3300/5300: Information on noise and vibration

4. Annex: Disposal Guidelines

Disposal of Material



Legislation and regulations	The legislation and regulations concerning the disposal of elevators, components and agents have to be observed. The disposal instructions describe an ideal situation, which can not be fulfilled in every case because of the special national situations.
Responsibilities	The owner of the installation is also owner of the material (substances, parts, components, subsystems and agent) which is released by the maintenance, modernization and replacement of the installation and therefore the owner is responsible for an environmentally and legally compatible disposal.
Maintenance and Modernization	The disposal of replaced parts, components and subsystems should be settled between the owner and the maintenance or modernization company. In those cases where Schindler performs maintenance and modernization, Schindler looks for an appropriate solution for the disposal together with the operator of the installation.
Hazardous substances	Hazardous substances and material should be taken back and properly disposed by the maintenance company. If the owner of the installation takes responsibility for the disposal, he must carry it out in accordance with the legal requirements, and he must also follow the instructions of the maintenance company.
Dismantling of the installation	When an installation is completely replaced, the disposal of the old installation must be arranged between the owner of the installation and the installer. In those cases where the new installation is delivered by Schindler, the company will arrange the disposal of the old installation by consulting the owner of the installation.



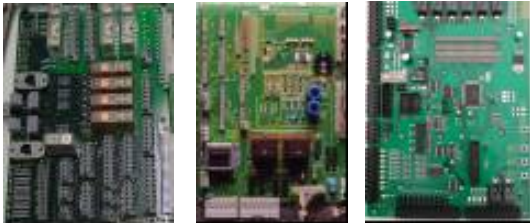
General disposal instructions


Hazardous waste	Hazardous waste e.g. oils, batteries, accumulators or luminescent tubes and other hazardous substances has to be removed before the dismantling of the installation and properly disposed.
Separation of material	<p>An optimal separation of materials allows high-quality recycling into different raw materials. A practical allocation of tasks between dismantling companies (separation on the building site) and the recycling company (scrap dealers) is to be anticipated. A rough separation of the removed material into hazardous substances, and into valuable and other secondary raw material should be performed during the dismantling according the following categories:</p> <ul style="list-style-type: none"> • Hazardous waste • Electrical and electronic equipment waste • Aluminum scrap • Non-magnetic steel scrap (Chrome-nickel and chrome steel) • Magnetic steel and iron scrap (non-alloy, low-alloy, and galvanized steel, cast iron) • Scrap containing copper (wires, electric motors, brass scrap) • Lead scrap (counterweight fillings) • Mineral waste • Waste for incineration
Counterweights	Counterweights filled with lead, gussolith or concrete must be delivered separately to the scrap dealer. If not, there is high risk that they cannot be longer distinguished from other scrap metal (large quantities of lead damage the oven).
Metal scrap	Metal scrap should be released as far as possible from impurities (rubber, oils and greases, wood, glass, rubbish, cleaning rags), which cause an increase of slag, dust and energy consumption and finally an increase of costs and environmental impact during re-smelt.
Hollow bodies in metal scrap	Hollow bodies in metal scrap should be cut (resp. the scrap dealer should be advised) and should be discharged form liquid i.e water and oil, which can cause explosions during melting down and injure personnel and installations.

Specific Disposal Instructions

*Category: REU = reuse, RC = recyclable, NRC = non-recyclable, HZ = hazardous waste

Subsystem; Components; parts; Material; substances	*Category:	Disposal instructions	Type of disposal	Reasons (others than resource conservation) / impacts	Picture
Batteries and accumulators containing heavy metals, e.g. from: <ul style="list-style-type: none"> • emergency power device (NSG) • Printed circuit boards (Prints) 	HZ	<ul style="list-style-type: none"> • Collect separately • Return to collecting station, manufacturer or specialized disposer • Do not dispose off with garbage. • Do not dispose on landfill. 	Recycling by authorized specialist firm	Danger of health and environment because of heavy metal and caustic liquid e.g. cadmium, lead, mercury, acid and alkali if improperly disposed.	
Oils and greases	HZ	<ul style="list-style-type: none"> • Collect separately • Return to collecting station, manufacturer or specialized disposer • Not allowed to get into water and soil 	Regeneration Incineration by industrial firing or HWIP ¹	Ecologically harmful 1 barrel oil (200 l) contaminates 30 m ³ soil.	
Luminescent tubes and energy saving lamps	HZ	<ul style="list-style-type: none"> • collect separately • may not be damaged during collection and transport • Return to collecting station, manufacturer or specialist disposer • Do not dispose with garbage. • Do not dispose on landfill. 	Recycling by authorized specialist firm	Danger of health and environment because of heavy metal e.g. cadmium, mercury, if lamps are broken or improperly disposed.	
Non-metals e.g. plastics, rubber, glass	RC	<ul style="list-style-type: none"> • If possible separate, collect and recycle sort by sort. • Do not mix with scrap iron. 	Recycling	<i>Non-metal foreign material is undesired during steel recycling.</i>	
	NRC	<ul style="list-style-type: none"> • Do not mix with scrap iron. 	Incineration with EFGT ² Landfill for inert material	Danger of health and environment because of improper disposal of plastics containing heavy metal and halogen.	

Subsystem; Components; parts; Material; substances	*Cate- gory:	Disposal instructions	Type of disposal	Reasons (others than resource conservation) / impacts	Picture
Copper and its alloys (bronze, brass, nickel sil- ver) e.g. in <ul style="list-style-type: none"> • Electro-motors (wind- ing) • Wires and cables • Travelling cable • Switch • Ring snail wheel (worm gear) 	RC	<ul style="list-style-type: none"> • Collect and recycle separated scrap iron. 	Recycling in sepa- rating melting plant, bronze and copper foundries	Copper is harmful to the me- chanical properties of steel and thus absolutely not de- sired in scrap iron. Valuable secondary raw mate- rial	
Aluminum <ul style="list-style-type: none"> • Door sills • Various parts 	RC	<ul style="list-style-type: none"> • Collect and recycle separated from scrap iron. 	Recycling in alumi- num foundries	Valuable secondary raw mate- rial	
Electrical and electronic scrap, like switches, trans- formers, relays, electro- magnetic switches, to be found in: <ul style="list-style-type: none"> • Control • Frequency converter • Landing operating panels • Car operating panels 	RC	<ul style="list-style-type: none"> • Collect separately • Return to collecting sta- tion, manufacturer or specialized disposer • Do not dispose with garbage. • Do not dispose on land- fill. 	Recycling and dis- posal by authorized specialist firm	Complex mixture of parts con- taining harmful material, e.g. plastics stabilized by heavy metals, halogenated flame retardants in boxes and printed circuit boards.	
Printed circuit boards (prints, PCB's), to be found in: <ul style="list-style-type: none"> • Control • Frequency converter • Landing operating panels • Car operating panels 	RC	<ul style="list-style-type: none"> • Collect separately • Return to collecting sta- tion, manufacturer or specialized disposer • Do not dispose with garbage. • Do not dispose on land- fill. 	Recycling and dis- posal by authorized specialist firm Recycling by LOC free of charge Send back to Schindler Electron- ics Ltd. 6600 Locarno Switzerland Please indicate on the box "Disposal Material"	Complex mixture of parts con- taining harmful material, e.g. plastics stabilized by heavy metals, halogenated flame retardants in boxes and printed circuit boards.	

Subsystem; Components; parts; Material; substances	*Cate- gory:	Disposal instructions	Type of disposal	Reasons (others than resource conservation) / impacts	Picture
High-alloy steel (stainless steel): <ul style="list-style-type: none"> Interior trim and accessories of cars made of chrome steel Car and hoistway doors 	RC	<ul style="list-style-type: none"> Collect and recycle separated from non- or low-alloy scrap iron. 	Recycling in steel plant for high alloyed steels	If non-alloy steel scrap is used for the production of non-alloy steel, the non-alloy steel scrap should be free of chrome, nickel and molybdenum. Valuable secondary raw material	
Non-alloy and low-alloy steel, e.g.: <ul style="list-style-type: none"> Guide rails Ropes Profile steel (e.g. machine frame) Car and door panels Permanent magnets (Caution magnetism!) Panels, boxes, frames Cast iron, e.g.: <ul style="list-style-type: none"> Speed governor Hub snail wheel Traction sheave Deflection pulley Brake drum 	RC	<ul style="list-style-type: none"> Collect and recycle separated from high-alloy scrap iron. 	Recycling in steel plant with filter	If non-alloy steel scrap is used for the production of non-alloy steel, the non-alloy steel scrap should be free of chrome, nickel and molybdenum. During incineration of old plastics, containing chlorine or painted coats, dioxins and furans are produced when gases cool down. Zinc from galvanized steel scrap gets together with discharge gas in the filter of the steel plant.	
Guide rails Counterweight filling	REU	<ul style="list-style-type: none"> If possible recuperate or reuse Check the possibility for taking back by Schindler. 			
	RC	<ul style="list-style-type: none"> Counterweight filling made of lead and concrete to be separated and collected sort by sort (never mix with scrap iron). 	Recycling in lead melting plant and concrete recycling plant	Lead is harmful to scrap iron recycling and therefore definitely not desired in scrap iron. In the same way for concrete.	

<i>Subsystem; Components; parts; Material; substances</i>	<i>*Cate- gory:</i>	<i>Disposal instructions</i>	<i>Type of disposal</i>	<i>Reasons (others than resource conservation) / impacts</i>	<i>Picture</i>
	RC	<ul style="list-style-type: none">Counterweight filling made of Gussolith to be separated and collected sort by sort (do not mix it with steel- or cast iron scrap).Inform the scrap dealer.	Recycling in steel plant	Heavy smoke gas emissions and toxic air emissions (e.g. PAH ³) due to binding agent tar.	

¹HWIP: Hazardous waste incineration plant

²EFGT: Enhanced flue gas treatment

³PAH: Polycyclic aromatic hydrocarbons. Some of these substances e.g. Benzopyren are cancerogenic.