

CATALOGUE OF MATERIALS ACCEPTED FOR REFINING AND REPROCESSING

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Activities	Recovery of non-ferrous metals including precious metals and their compounds and, in addition, sulphuric acid and non-ferrous silicate construction materials from primary and secondary raw materials.		
Products	Copper in the form of cathodes, continuous cast shapes, continuous cast wire rod, powder, copper compounds, copper salts, silver, gold, lead, metals, alloys and compounds on the basis of Pt, Pd, Rh, Ni, Sb, Se, Sn, Bi, Zn, As, Te sulphuric acid, oleum iron silicate construction stone in lumpy form (gravel, water embankment construction materials and granulate as raw materials for mineral abrasive agents).		

Technologies:

In the **primary copper smelter** copper anodes (copper content approx. 99 %) are produced from copper ore concentrates in a multi-stage pyrometallurgical process. In each process stage recycling materials can be used for the recovery of the metals contained. Copper cathodes with a copper content of more than 99.99 % are produced electrochemically from the copper anodes in the copper tankhouse. The cathodes are used for the production of continuous cast wire rod, shapes and metal powder.

The iron contained in the concentrates and recycling materials is recovered by adding silicate containing materials (sand or other SiO₂ containing materials) in the form of iron silicate stone. This is processed to quality assured construction materials for paths, roads and river embankments as well as to mineral abrasives.

Apart from NA's own intermediary products (flue dust, slag, slimes) the intermediary products from other smelters along with industrial recycling materials and wastes are treated in the **secondary smelter** in order to recover the valuable metals contained (in particular Cu, Pb, Ni and precious metals). The copper and lead matrix produced is further processed in the following pyrometallurgical and hydrometallurgical plants to separate the other metals contained (gold, silver, platinum, palladium, nickel, bismuth, arsenic, antimony, selenium, tellurium, tin, zinc). These metals contained in the feed materials are further enriched in order that they may be marketed as saleable metals (Pb, Ag, Au, Se), alloys (Bi) or chemical compounds (e.g. Pt-Pd-Nitrat-Solutions, NiSO₄, As₂O₃, Na₂TeO₃, ZnO). Sulphur dioxide-bearing process gases from the primary and secondary smelters are dedusted and then cleaned in a multi-stage process. Finally the SO₂ is converted to sulphuric acid and oleum, two saleable products, in the double absorption contact acid plants. The off-gases from the melting and refining processes are treated in special off-gas cleaning plants, any wastewater arising is treated in state-of-the-art wastewater treatment plants.

Internal intermediary products and bought recycling materials, which are rich in precious metals, are processed to recover their precious metals. Above all, anode slimes from NA's own and outside copper tankhouses as well as precious metal-bearing skimmings and sulphur-bearing bullion are treated in the top blown rotary converter. The SO₂- and SeO₂-containing off-gases are cleaned in an off-gas scrubber and the SO₂ is processed into sulphuric acid in the double absorption acid plants. The selenium is extracted as wet selenium. Raw materials low in sulphur and selenium, which are largely types of bullion rich in precious metals, are fed into the refining furnace, refined and finally processed into silver bars or silver anodes for the precious metal refinery. The off-gas from the refining furnace is collected in an off-gas treatment plant.

Authorisation No.	B 01 BV 0039
Processing capacity	Processing of > 300,000 t p.a. of metal-containing materials, regardless of material consistency and composition
Plant permits	"Plants for the production of non-ferrous metals from ores and secondary raw materials" Plants in acc. with Section 3.2 column 1 of the 4 th BImSchV
Authorities issuing permits and monitoring operations	Umweltbehörde der Freien und Hansestadt Hamburg Amt für Immissionsschutz und Betriebe, Referat K 31 Billstr. 84, 20539 Hamburg
Permit reference nos.	- 5/70 dated 28.12.1970 and subsequent amendments, - 203/86 dated 08.05.1989 and subsequent amendments, - 191/97 dated 21.01.1998.and subsequent amendments.
Approval as reprocessing plant	NA's plants are registered as approved reprocessing facilities for wastes, for recycling in accordance with the council regulation on the supervision of shipments of waste within, into and out of the European Community (f259/93) as per Section 9.
Reprocessing method	R 4
Acceptance criteria	
Minimum quantity	15 t, in certain cases from 10 t and more
Physical condition	lumpy material, non-dusting bulk, conditioned dust (e.g. briquettes, pellets), thick slimes
Composition	Cu > 5 % or Pb > 5% or Ni > 2 % and Cr < 5%, K < 2%, Na <2 %, Zn < 10 %, Cd < 1 %, As <1 %, Sb < 1%, Hg < 1%, Cl <1 %, Br < 0,3%, F <0,5 % CN disturbs, organic material and plastics can only be used to a limited extent.
Source of supply	Worldwide
Other conditions	Random testing necessary for materials offered for the first time.
Packing	Bulking, big bags, drums, containers, troughs
Delivery	Material delivery free works
Means of transport	Inland waterway vessels, rail, truck
Costs	A processing fee depending on the type of material will be agreed, valuable metals will be valued depending on content and reduce costs. Conclusion of long-term agreements possible.

CATALOGUE OF MATERIALS ACCEPTED FOR TREATMENT AND REPROCESSING:

In the following a short description of the material groups used in the smelting processes. A detailed list of the approved materials in accordance with the waste codes is given in the following table.

Material group	Short description / Examples
Copper	Copper scrap including chips, shredder scrap, cable scrap (granulated, transformer coils, also PCB-containing copper-bearing electronic scrap (platinum scrap))
Copper alloys	Bronze/gun metal scrap , copper bearing catalysts
Copper containing material	Copper-containing slimes, anode slimes, other metal-containing galvanic and hydroxide slimes, metal oxide, copper etching solutions, copper-containing slag, copper-containing ash and copper-containing matte, filter dust
Lead	Lead scrap
Lead-containing material	Lead-containing galvanic sludges and sludges from insolubilisation treatment, lead oxide and lead hydroxide, lead skimmings, lead-containing ashes and residues (matte, dross, skimmings)
Nickel-containing material	Nickel bearing scrap, catalysts, galvanic slimes
Precious metal containing material	Scrap containing precious metals, catalysts, slimes, electronic scrap, platinum scrap, tipped ash from the burning of photographic films; ash, flue dust and slimes containing precious metals, silver/mercury-containing button cells, sweeps and fines, copper silver bullion and PM-alloys
Silica-containing material	Sand from ground scrubbers, monitors and other technical glasses, radiation residue with hazardous impurities, residue from silicon production, casting plant spent sand, silicon-containing residues, settling slime ash, furnace reverts

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EWC-Group	Group name	EWC-Code	Description
0507	waste from natural gas purification and transportation	050702	wastes containing sulphur
0601	waste from the MFSU of acids	060102*	hydrochloric acid
0603	waste from the MFSU of salts and their solutions and metallic oxides	060313*	solid salts and solutions containing heavy metals
		060314	solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13
		060315*	metallic oxides containing metals
		060316	metallic oxides other than those mentioned in 06 03 15
0604	metal-containing wastes other than those mentioned in 06 03	060403*	wastes containing arsenic
		060405*	wastes containing other heavy metals
		060499	wastes not otherwise specified
0605	sludges from on-site effluent treatment	060502*	sludges from on-site effluent treatment containing dangerous substances
		060503	sludges from on-site effluent treatment solutions other than those mentioned in 06 05 02
0606	wastes from the MFSU of sulphur chemicals, sulphur chemical processes and desulphurisation	060602*	wastes containing dangerous sulphides
		060603	wastes containing sulphides other than those mentioned in 06 06 02
0608	wastes from the MFSU of silicon and silicon derivatives	060899	wastes not otherwise specified
0613	wastes from inorganic chemical processes not otherwise specified	061302*	spent activated carbon (except 06 07 02)
0701	wastes from the MFSU of basic organic chemicals	070111*	sludges from on-site effluent treatment containing dangerous substances
		070112	sludges from on-site effluent treatment other than those mentioned in 07 01 11
0802	wastes from MFSU of other coating (including ceramic materials)	080201	waste coating powders
0901	wastes from the photographic- industry	090106*	waste containing silver from on-site treatment of photographic waste
		090107	photographic film and paper containing silver or silver compounds
1001	wastes from power stations and other combustion plants (except 19)	100101	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
		100114*	bottom ash, slag and boiler dust from co-incineration containing dangerous substances
		100115	bottom ash, slag and boiler dust from co-incineration containing dangerous substances other than those mentioned in 10 01 14

		100116*	fly ash from co-incineration containing dangerous substances
		100117	fly ash from co-incineration other than those mentioned in 10 01 16
1002	wastes from the iron and steel industry	100201	wastes from the processing of slag
		100207*	Solid wastes from gas treatment containing dangerous substances
		100208	solid wastes from gas treatment other than those mentioned in 10 02 07
		100213*	sludges and filter cakes from gas treatment containing dangerous substances
		100214	sludges and filter cakes from gas treatment other than those mentioned in 10 02 13
		100215	other sludges and filter cakes
1004	wastes from lead thermal metallurgy	100401*	slags from primary and secondary production
		100402*	dross and skimmings from primary and secondary production
		100404*	flue-gas dust
		100405*	other particles and dust
		100406*	solid wastes from gas treatment
		100407*	sludges and filter cakes from gas treatment
		100499	wastes not otherwise specified
1005	wastes from zinc thermal metallurgy	100501	slags from primary and secondary production
		100503*	flue-gas dust
		100504*	other particles and dust
		100505*	solid wastes from gas treatment
		100506*	sludges and filter cakes from gas treatment
		100599	wastes not otherwise specified
1006	wastes from copper thermal metallurgy	100601	slags from primary and secondary production
		100602	dross and skimmings from primary and secondary production
		100603*	flue-gas dust
		100604*	other particles and dust
		100606*	solid wastes from gas treatment
		100607*	sludges and filter cakes from gas treatment
		100699	wastes not otherwise specified
1007	wastes from silver, gold and platinum thermal metallurgy	100701	slags from primary and secondary production
		100702	dross and skimmings from primary and secondary production
		100703	solid wastes from gas treatment
		100704	other particles and dust
		100705	sludges and filter cakes from gas treatment
		100799	wastes not otherwise specified
1008	wastes from other non-ferrous thermal metallurgy	100804	particles and dust
		100808*	salt slag from primary and secondary production
		100809	other slags
		100814	anode scrap
		100815*	flue-gas dust containing dangerous substances
		100816	flue-gas dust other than those mentioned in 10 08 15
		100817*	sludges and filter cakes from flue-gas treatment containing dangerous

			substances
		100818	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 08 17
1009	wastes from casting of ferrous pieces	100903	furnace slag
		10 09 05*	casting cores and moulds which have not undergone pouring containing dangerous substances
		10 09 06	casting cores and moulds which have not undergone pouring other than those mentioned in 10 09 05
		10 09 07*	casting cores and moulds which have undergone pouring containing dangerous substances
		10 09 08	casting cores and moulds which have undergone pouring other than those mentioned in 10 09 07
		10 09 09*	flue-gas dust containing dangerous substances
		10 09 10	flue-gas dust other than those mentioned in 10 09 09
		10 09 11*	other particulates containing dangerous substances
		10 09 12	other particulates other than those mentioned in 10 09 11
1010	wastes from casting of non-ferrous pieces	10 10 03	furnace slag
		10 10 05*	casting cores and moulds which have not undergone pouring, containing dangerous substances
		10 10 06	casting cores and moulds which have not undergone pouring, other than those mentioned in 10 10 05
		10 10 07*	casting cores and moulds which have undergone pouring, containing dangerous substances
		10 10 08	casting cores and moulds which have undergone pouring, other than those mentioned in 10 10 07
		10 10 09*	flue-gas dust containing dangerous substances
		10 10 10	flue-gas dust other than those mentioned in 10 10 09
		10 10 11*	other particulates containing dangerous substances
		10 10 12	other particulates other than those mentioned in 10 10 11
1011	wastes from manufacture of glass and glass products	10 11 03	waste glass-based fibrous materials
		10 11 05	particulates and dust
		10 11 11*	waste glass in small particles and glass powder containing heavy metals (for example from cathode ray tubes)
		10 11 12	waste glass other than those mentioned in 10 11 11
		10 11 99	wastes not otherwise specified
11 01	wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline	11 01 05*	pickling acids

degreasing, anodising)

		11 01 06*	acids not otherwise specified
11 02	wastes from non-ferrous hydrometallurgical processes	11 02 03	wastes from the production of anodes for aqueous electrolytical processes
		11 02 05*	wastes from copper hydrometallurgical processes containing dangerous substances
		11 02 06	wastes from copper hydrometallurgical processes other than those mentioned in 11 02 05
		11 02 07*	other wastes containing dangerous substances
12 01	wastes from shaping and physical and mechanical surface treatment of metals and plastics	12 01 03	non-ferrous metal filings and turnings
		12 01 04	non-ferrous metal dust and particles
		12 01 14*	machining sludges containing dangerous substances
		12 01 15	machining sludges other than those mentioned in 12 01 14
		12 01 16*	waste blasting material containing dangerous substances
		12 01 17	waste blasting material other than those mentioned in 12 01 16
		12 01 18*	metal sludge (grinding, honing and lapping sludge) containing oil
		12 01 20*	spent grinding bodies and grinding materials containing dangerous substances
		12 01 21	spent grinding bodies and grinding materials other than those mentioned in 12 01 20
13 07	wastes of liquid fuels	13 07 01*	fuel oil and diesel
		13 07 03*	other fuels (including mixtures)
16 02	wastes from electrical and electronic equipment	16 02 09*	transformers and capacitors containing PCBs
		16 02 10*	discarded equipment containing or contaminated by PCBs other than those mentioned in 16 02 09
		16 02 13*	discarded equipment containing hazardous components (2) other than those mentioned in 16 02 09 to 16 02 12
		16 02 14	discarded equipment other than those mentioned in 16 02 09 to 16 02 13
		16 02 15*	hazardous components removed from discarded equipment
		16 02 16	components removed from discarded equipment other than those mentioned in 16 02 15
16 03	off-specification batches and unused products	16 03 03*	inorganic wastes containing dangerous substances
		16 03 04	inorganic wastes other than those mentioned in 16 03 03
16 06	batteries and accumulators	16 06 01*	lead batteries
		16 06 02*	Ni-Cd batteries
		16 06 03*	mercury-containing batteries
		16 06 05	other batteries and accumulators
16 08	spent catalysts	16 08 01	spent catalysts containing gold, silver,

			rhenum, rhodium, palladium, iridium or platinum (except 16 08 07)
		16 08 02*	spent catalysts containing dangerous transition metals (3) or dangerous transition metal compounds
		16 08 03	spent catalysts containing transition metals or transition metal compounds not otherwise specified
		16 08 04	spent fluid catalytic cracking catalysts (except 16 08 07)
		16 08 07*	spent catalysts contaminated with dangerous substances
16 11	waste linings and refractories	16 11 01*	carbon-based linings and refractories from metallurgical processes containing dangerous substances
		16 11 02	carbon-based linings and refractories from metallurgical processes other than those mentioned in 16 11 01
		16 11 03*	other linings and refractories from metallurgical processes containing dangerous substances
		16 11 04	other linings and refractories from metallurgical processes other than those mentioned in 16 11 03
17 02		17 02 04*	glass, plastic and wood containing or contaminated with dangerous substances
17 04	metals (including their alloys)	17 04 01	copper, bronze, brass
		17 04 03	lead
		17 04 04	zinc
		17 04 06	tin
		17 04 07	mixed metals
		17 04 09*	metal waste contaminated with dangerous substances
		17 04 10*	cables containing oil, coal tar and other dangerous substances
		17 04 11	cables other than those mentioned in 17 04 10
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil	17 05 03*	soil and stones containing dangerous substances
		17 05 04	soil and stones other than those mentioned in 17 05 03
		17 05 05*	dredging spoil containing dangerous substances
		17 05 06	dredging spoil other than those mentioned in 17 05 05
19 01	wastes from incineration or pyrolysis of waste	19 01 05*	filter cake from gas treatment
		19 01 10*	spent activated carbon from flue-gas treatment
		19 01 11*	bottom ash and slag containing dangerous substances
		19 01 12	bottom ash and slag other than those mentioned in 19 01 11
		19 01 13*	fly ash containing dangerous substances
		19 01 14	fly ash other than those mentioned in 19 01 13
		19 01 17*	pyrolysis wastes containing dangerous substances
		19 01 18	pyrolysis wastes other than those mentioned in 19 01 17

		19 01 19	sands from fluidised beds
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)	19 02 05*	sludges from physico/chemical treatment containing dangerous substances
		19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
		19 02 07*	oil and concentrates from separation
		19 02 11*	other wastes containing dangerous substances
19 08	wastes from waste water treatment plants not otherwise specified	19 08 13*	sludges containing dangerous substances from other treatment of industrial waste water
		19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 09	wastes from the preparation of water intended for human consumption or water for industrial use	19 09 02	sludges from water clarification
		19 09 04	spent activated carbon
19 10	wastes from shredding of metal-containing wastes	19 10 02	non-ferrous waste
		19 10 03*	fluff-light fraction and dust containing dangerous substances
		19 10 04	fluff-light fraction and dust other than those mentioned in 19 10 03
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	19 12 03	non-ferrous metal
		19 12 05	glass
		19 12 09	minerals (for example sand, stones)
19 13	wastes from soil and groundwater remediation	19 13 01*	solid wastes from soil remediation containing dangerous substances
		19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01