Tata Steel Technical Standard

S1 47 12 01 Media definitions; Descriptions and design principles of media and energy carriers present at Tata Steel.

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Information and changes

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1. GENERAL

1.1. Scope

In this standard, all media and energy carriers at Tata Steel IJmuiden are coded and described briefly. For safety reasons, identical codes have been assigned to the same media throughout the site.

These codes must be used in diagrams and other documents.

In the case of specific properties (pressures, temperatures, compositions, applications etc.), information must be obtained from users and/or managers of installations that deal with this substance.

The revision triangle indicates the changes made with reference to the previous version 

1.2. Chemical Substances System

In addition to the data presented in this standard, Tata Steel has a system in which all environmentally hazardous substances are registered. Tata Steel has established a Chemical Substances System; (CSS: Chemische stoffen zoeken - Tata Steel Online) in which a substance card number has been assigned to each substance. The substance cards state the following, among other things: physical properties, hazards, prevention and extinguishing agents, and cleaning and storage methods.

The risks are indicated in the form of H sentences with a code. This code can be used when classifying the medium into substance groups as referred to in the pressure equipment regulation. See for this R1300401 - Handleiding besluit drukapparatuur. (Only in Dutch available).

1.3. Coding approach

The coding consists of a 2-letter combination. The first letter of the code is derived from the following main classification:

C = Chemicals

D = Various

G = Gases

K = Coal*

L = Air

O = Oil

S = Steam

V = Solid particles transported by an medium*

W = Water

(div) = Miscellaneous

The second letter is a typical letter for the medium in question. When all second letters are used, a number is applied. For some media, a third letter is used to specifically name that medium.

* When solid particles are transported by means of a liquid or gas through a line, then this combination is seen as a medium (also from the PED). The coding starts with the media code of the carrier followed by a slash / through the media code of the solid (s). Codes can be combined, here some examples:

Nitrogen / Calcium carbide GS/VC,

Liquid air / Phenolic resin LP/VF,

Nitrogen / Calcium carbide + Magnesium GS/VC+VM,

Nitrogen + Liquid air / Injection of coal GS+LP/KI (see chapter 5 for Coal (K))

A combination of solids or their carriers is indicated with a '+' sign. The slash '/' indicates the separation between carrier(s) and solid particle(s). If there are multiple carriers or solid particles then they will be placed in alphabetical order. For example: GS+LP or VC+VM.

Each media definition in this standard is a translated version of the Dutch definition, in the plant you will find Dutch media definitions, therefor is behind each paragraph the Dutch media definition mentioned between parentheses.

2. CHEMICALS C

2.1. Chemical waste CA (Chemisch afval)

-	None

Since it is not possible to assign a separate code to each type of chemical waste, the CA code has been chosen for all types of chemical waste.

2.2. Chlorine bleach lye CB (Chloorbleekloog)

CS1677	Chlorine bleach lye (10%<active chlorine<16%)
CS1678	Chlorine bleach lye (active chlorine>=16%)

Chlorine bleach lye (sodium hypochlorite) is supplied by third parties or made independently from lye + chlorine. It is used to prevent growth in cooling systems.

Properties: Crystallisation of NaCl at -16°C, highly corrosive (do not use copper and nickel).

2.3. Soda CC (Soda)

CS0029	Soda, crystal soda

Application: iron bath addition

2.4. Citric acid CD (Citroenzuur)

CS0009	Citric acid
CS1357	Citric acid, monohydrate
CS5193	Buffer solution pH=4 (citric acid/sodium hydroxide/hydrogen chloride)
CS5822	Extran AP 22

Citric acid is a weak organic acid. It occurs in citrus fruits and is a natural preservative and antioxidant.

2.5. Electrolyt CE (Elektrolyt)

4.4

CS6748	Tin MSA plating bath (TSP WG4 en 5)

Medium as a mixture of multiple electrolyts, usually at TSP.

2.6. Phosphoric acid CF (Fosforzuur)

4.4

CS0096	Phosphoric acid (> 25% in water)

Raw material, which is used in biological treatment at Cokesplant 2.

2.7. **Freon CG** (Freon)

4.4

-	Geen

The substance was previously used in cooling systems and as a degreaser.

Application must be avoided for environmental reasons (ozone problem).

2.8. **Hydrazine CH** (Hydrazine)

4.4

CS0690	Hydrazine hydrate (55%)

The substance is used for oxygen binding in water and NOx binding in sulphuric acid.

2.9. **MEA (fresh) CI** (MEA (vers))

Monoethanolamine 99%

CS0119	MEA (2-aminoethanol)

The substance is used at Cokesplant 1 to extract H_2S.

2.10. **MEA (solution) CJ** (MEA (oplossing))

4.4

The substance is used at Cokesplant 1 to extract H_2S.

2.11. **Biotex CK** (Biotex)

-	None

-

2.12. **Caustic soda CL** (Natronloog)

CS1930	Caustic soda (2 - 5% in water)
CS1992	Sodium hydroxide solution (< 0.5% in water)
CS1892	Sodium hydroxide solution (0.5 - 2% in water)
CS1891	Caustic soda >5% -10%
CS0098	Caustic soda 10-50%

Caustic soda is supplied in various solution percentages.

Applications include:

- neutralisation agent for acidic streams;
- treatment of oil/water emulsions;
- checking the pH content of the boiler feed water.
- Regenerating anion and mix bed filters in the demineralisation plant. A lye concentration of 5.4% is used for regeneration.
- For neutralising the waste water in the neutralisation tanks of the demineralisation plant. A NaOH solution of 25% is used for this purpose.

Properties: corrosive (especially for aluminium and zinc), depending on the temperature. Possibility of further crystallisation.

The MAC value of caustic soda is 2 mg/m^3; lye is nearly odourless.

Caustic soda has a concentration of 50% when it is supplied. During discharge, this concentration is diluted with A-water to 25%, because 50% lye already crystallises at +12°C, whereas it only crystallises at -18°C when it is 25%. There are 2 storage tanks containing 65 m^3 of 25% lye and 2 storage tanks containing 17 m^3 of 5.4% lye present in the demineralisation plant.

2.13. **Potassium hydroxide CLK** (Kaliumhydroxide)

CS1924	Potassium hydroxide

The chemical substance is used at KGF2. Molecular formula: KOH

2.14. **Ammonium sulphate solution CM** (Ammoniumsulfaat oplossing)

Synonym: mother liquor.

Application: Saturated washing liquid for ammonia washing.

It is a process flow at Cokesplant 1: 47% $(NH_4)_2.SO_4$ ammonium sulphate.

4.4 The CSS states the following under Ammonium:

CS0002	Ammonium chloride
CS0037	Ammonium sulphate
CS1788	Di-ammonium tartrate
CS1897	Ammonium molybdate, anhydrous
CS2114	Ammonium molybdate solution
CS2179	Di-ammonium oxalate, monohydrate
CS2181	Hydroxylammonium chloride
CS2193	Ammonium acetate
CS2194	Ammonium persulphate
CS2436	Ammonium tetrachloro cuprate, dihydrate
CS2437	Di-ammonium hydrogen citrate
CS3891	Ammonium iron (III) sulphate dodecahydrate
CS3892	Ammonium iron (II) sulphate hexahydrate
CS4534	Tetra-n-butylammonium hydroxide solution in 2-propanol / methanol
CS5138	Ammonium iodide
CS5140	Ammonium thiocyanate solution
CS6593	Ammonium iron (II) sulphate solution 20 g/l, acidified
CS7734	Ammonium persulphate 20% solution in water
CS7740	Ammonium heptamolybdate tetrahydrate (trial)
CS9215	LCK 304 Ammonium analyse-kuvet 1/2

2.15. **Ammonium sulphate slurry CN** (Ammoniumsulfaat slurry)

CS0037	Ammonium sulphate slurry

Ammonium sulphate slurry is evaporated mother liquor from vacuum crystallisation.

It is a process flow at Cokesplant 1.

2.16. **Conditioning CO** (Conditionering)

4.4

CS0944	Spectrus BD1506
CS1888	DIANODIC DN2240
CS2313	Cortrol OS-7780
CS3884	Optisperse HP-5463
CS6102	GENGARD GN7004

Pure conditioning for media.

2.17. **Parafenolsulfonic acid CP** (Parafenolsulfonzuur)

4.4

CS2220	Diphenylamine sulfonic acid, sodium salt
CS5020	4-amino-3-hydroxynaphthalene-1-sulfonic acid

Origin: supplied by third parties, 65% solution in water. At TSP the acid is replaced for methane sulfonic acid (CPM).

2.18. **Flux CPF** (Flux)

CS5090	Flux

Flux is used at TSP.

2.19. **Methane sulfonic acid CPM** (Methaansulfonzuur)

4.4

CS0760	Ronastan TP acid
CS5437	Ronastan TP-G7 ADDITIEF LF

Is used at TSP for tinning.

2.20. **Lithium bromide CQ** (Lithium bromide)

4.4

-	None

Lithium bromide is a solid, odourless white substance.

2.21. **Chromic acid CR** (Chroomzuur)

4.4

CS0081	Chromic (VI) oxide
CS1614	Chromic acid solution (<25%)

The raw material is supplied by third parties.

2.22. **Chromium sulphate CRS** (Chroomsulfaat)

CS8074	Chromium sulfate

Is used at TSP.

2.23. **Liquid sulphur CS** (Vloeibare zwavel)

-	-

Occurs at cokesplants.

2.24. **Sodium dichromate CT** (Natriumbichromaat)

CS1018	Sodium dichromate solution (>25%)

CS1625	Sodium dichromate solution (2.5 - 25%)

The substance is applied in the tinning plants of TSP.

2.25. **Sodium formate CTF** (Natriumformiaat)

CS8141	Sodium formate

Is used at TSP for chroming.

2.26. **Sodium sulphate CTS** (Natriumfsulfaat)

CS1901	Sodium sulfate
CS8075	Sodium sulfate 20% solutions

Is used at EVB.

2.27. **Sodium sulphide CTU** (Natriumsulfide)

4.4

CS1248	Sodium sulfide solution (10-25%)

2.28. **Hydrochloric acid CU** (Zoutzuur)

CS1394	Hydrochloric acid (<10% in water)
CS1232	Hydrochloric acid (10-25% in water)
CS0042	Iron (II) chloride solution, containing hydrochloric acid
CS0092	Hydrochloric acid (>25% in water)
CS5194	Buffer solution pH 2 (citrate / hydrochloric acid)
CS5197	Buffer solution pH 8 (borate / hydrochloric acid)
CS5268	Iron standard solution
CS6033	Buffer concentrate for 500 ml of buffer solution pH=4 (citrate/hydrochloric acid) Titrisol
CS7020	BelloZon Hydrochloric acid 30%

Origin:

- approx. 36% of hydrochloric acid is supplied by third parties;
- approx. 18% of hydrochloric acid comes from hydrochloric acid regeneration.

Applications include:

- pickling a plate.
- Regenerating cation and mix bed filters in the demineralisation plant. A hydrochloric acid concentration of 10% is used for regeneration.
- For neutralising the waste water in the neutralisation tanks of the demineralisation plant. An HCl solution of 33% is used for this purpose.

There are 3 storage tanks of 65 m^3 of 33% hydrochloric acid and 2 storage tanks of 15 m^3 with 10% hydrochloric acid present in the demineralisation plant.

Properties: highly corrosive, colourless, smoking liquid, boiling point at -85°C. Vapour heavier than air.

When hydrochloric acid comes into contact with iron, a very explosive gas forms. Open fires and smoking are therefore prohibited!

To prevent contact with hydrochloric acid, all steel parts are coated with ebonite and plastic is used as much as possible.

The MAC value for hydrochloric acid is 5 ppm. This value may already have been exceeded, because the hydrochloric acid can be smelled.

2.29. **Urea CV** (Ureum)

CS0112	Urea Prills (46% U)

4.4

It is used at KGF1&2 and as a raw material for NO_x treatment in flue gases.

2.30. **Anti-foam/oxidation CW** (Anti schuim /oxidatie)

4.4

CS1607	Anti-foam MC80
CS6627	Surfynol MD 20 anti-foaming agent (trial)

-

2.31. **BTX CX** (BTX)

CS1404	BTX
CS1405	BTX wax oil

BTX is a product that is extracted in the BTX plant from wax oil from the coke furnace gas treatments of Cokesplant 1 and 2.

2.32. **Lithium bromide weak solution CY** (Lithium bromide zwakke oplossing)

4.4

-	None

-

2.33. **Sulphuric acid CZ** (Zwavelzuur)

4.3

CS1656	Sulphuric acid (<5% in water)
CS0102	Sulphuric acid 96/98%
CS1231	Sulphuric acid (5-15% in water)
CS0123	Sulphuric acid 50% Technical IBS1120KG
CS1929	Sulphuric acid solution 0.1 N standard
CS1605	Sulphuric acid solution R1 Silkostat 8891
CS2488	CMS Cleaner 100 (< 51% sulphuric acid)
CS5135	Amido sulphuric acid ultra clear
CS8016	Sulphuric acid 96%

Origin:

- 96 - 98% sulphuric acid solution is supplied by third parties;
- different solution percentages between 76% and 96% occur at the KGF1&2 and are produced at the sulphuric acid plant.

Application:

- regulating acidity in water (tinning plant), but it is also sold (for use in sulphate preparation).

Properties: highly corrosive (depending on temperature, among other factors). Vapour heavier than air.

3. VARIOUS D

3.1. **Waste DA** (Afvalstof)

-	None

This code is applied within the ENB code registration system. In principle, this code should be applied as little as possible. This code should only be chosen if no better coding is available.

3.2. **Sludge DB** (Slib)

CS2200	Rolling oil can sludge KW 11 and 12
CS2199	ONO sludge EV14
CS2160	Tin sludge
CS6000	Chrome sludge EV14
CS7246	BIO 2000 sludge

Sludge is created in the acceleration process in the demineralisation plant. This waste product is captured and thickened via a centrifuge, after which the thickened sludge (dry sludge) is sent untreated to the central waste processing company (WMA). It is eventually reused in sinter production. The sludge from the acceleration process mainly consists of $CaCO_3$.

3.3. **Chlorine DC** (Chloor)

4.4

-	None

-

3.4. **Drainage water DD** (Drainage water)

-	None

-

3.5. **Biocide DE** (Biocide)

4.4

-	

Biocide injection is an chemical substance of micro-organism use tod eter or neutralize organisms.

3.6. **Ferric (III) chloride DF** (Ferry(III) chloride)

4.4

CS0811	Ferric (III) chloride (40% in water)
CS2344	Ferric (III) chloride, hexahydrate

Ferric (III) chloride is used in the acceleration process in the demineralisation plant. Ferric (III) chloride is an inorganic coagulant. The colloidal and organic particles in the Lek water make contact with Fe^{3+} ions and are neutralised. Small agglomerated particles are formed, which eventually grow into long polymers with the help of other chemicals. Ultimately, these particles are discharged as sludge.

3.7. **Glycol DG** (Glycol)

CS0514	Ethylene glycol
CS8961	Monoethylene glycol >=25%
CS1868	Polyethylene glycol 200
CS3454	Dipropylene glycol
CS3082	Propylene glycol

4.4

3.8. **Wood flour slurry DH** (Houtmeel slurry)

-	None

Applied at Cokesplant 2.

3.9. **Isopropanol DI** (Isopropanol)

CS0048	2-propanol – 100% isopropanol
CS5954	Maintenance Kit for Weber – 60-100% Isopropanol
CS6509	Isopropanol 5% in water

Is used at R&D and TSTC

4.4

3.10. **Corrosion inhibitor DJ** (Corrosieremmer)

CS5852	Anticorit PLS 100 T

Addition to media in favor of pipe life.

3.11. **Calcium hydroxide DK** (Calciumhydroxide)

CS0917	Calcium hydroxide

Calcium hydroxide Ca(OH)2 or slaked lime is strongly alkaline, and it decays into $Ca2^{+}$ and OH^{-} when it is dissolved in water and is then called lime milk.

Calcium hydroxide Ca(OH)2 is used in the accelerator process to remove the temporary hardness (especially Ca2+ and Mg2+ and CO32- ions) from Lek water. By adding lime milk, the water in the accelerator is kept at a pH value of 10. Due to the pH increase, the Ca(HCO3)2 and Mg(HCO3)2 salts dissolved in the form of bicarbonates precipitate as insoluble CaCO3 and Mg(OH)2. The majority of the resulting sludge in the acceleration tower consists of CaCO3.

Is used, among other things, in Hisarna, carried by an N2 stream for mixing in the reaction vessel.

3.12. **Calcium oxide DKO** (Calciumoxide)

CS0106	Calcium oxide

Quicklime, molecular formula: CaO

3.13. **Liquid ammonia DM** (Ammoniak vloeibaar)

CS0011	Ammonia
CS1983	Ammonia (25 - 50% ammonia in water)
CS0131	Ammonia (10 - 25% ammonia in water)

CS1982	Ammonia (5 - 10% ammonia in water)

Liquid ammonia, among others, is used with the DENOx at the furnaces of the hot strip mill.
Ammonia (gaseous) is used in the demineralisation plant for:

- increasing the pH value in the M-water network.
- increasing the pH value of the K-water for measurements of the sodium content in the K-water.

Ammonia (gaseous and liquid) is used at the pumping stations of the energy company.

3.14. **Nalco DN** (Nalco)

4.4

CS0142	Nalsperse 7348
CS0186	Nalco Elimin-OX
CS0448	Nalco 71601
CS0526	Nalco 7132
CS1649	Nalco 7385
CS1651	Nalco 1392
CS3199	Nalco 71403
CS3275	Nalsperse 73550
CS3578	Nalco 8315
CS3687	3D Trasar 3DT133
CS3689	3D Trasar 3DT184
CS4495	Nalco TR5500FCS
CS5410	Trac107 Plus
CS5411	Nalco 7330
CS5573	Nalco 77352
CS6549	Water Care-Copper
CS7100	3D Trasar 3DT121 (trial)
CS7814	Nalprep IV
CS7973	Nalco 77135
CS8288	Nalco BT-3801
CS8291	3D TRASAR 3DT449
CS8304	Nalco 71459
CS8739	Trasar Trac101
CS9127	pHREEdom 5200M
CS9456	3D TRASAR 3DT185
CS9458	NALCO 1393T
CS9459	NALCO 8506PLUS
CS9460	NALCO TRAC114 PLUS
CS9461	NALCO® 7137
CS9481	3D TRASAR 3DT120
CS9595	NALCO® 7138

The Nalco company supplies various products used for the conditioning of cooling water systems and at the pump stations of the energy company (ENB).

3.15. **Degreasing agent KB 35 – DOK** (Ontvettingsmiddel KB 35)

CS2332	KB35

Is used at TSP.

3.16. **Polymer DP** (Polymeer)

4.4

CS1436	Lewatit IN 42
CS2129	Novus CE2688E

A flocculant of the Nalco company is currently being used in the acceleration process at the demineralisation plant. A flocculant is a long-chain polymer with active groups at certain locations on this chain. This polymer binds small particles together and forms mutual bridges. This creates larger flakes that are caught and removed as sludge.

3.17. **Formaldehyde DS** (Sterkwater)

CS0324	Formaldehyde

Formaldehyde is processed in the de-acidifier and distillation column at Cokesplant 2.

The substance is corrosive (aluminium and zinc).

3.18. **Coal tar DT** (Koolteer)

CS0022	Coal tar

Coal tar is a by-product of the Cokesplants.

3.19. **Liquid sugar products DV** (Vloeibare suikerproducten)

CS8801	Liquid sugar products

In use at R&D.

3.20. **Ammonium sulphate DZ** (Ammoniumsulfaat)

CS0037	Ammonium sulphate
CS3891	Ammonium iron (III) sulphate dodecahydrate
CS3892	Ammonium iron (II) sulphate hexahydrate

Solid substance. This code was existing before the group solid particles (vaste stoffen, V) was made, therefor it is not in the chapter 5 (V).

4. GASES G

4.1. Natural gas GA (Aardgas)

CS0110	Natural gas

Natural gas is supplied from the distribution system of Gasunie Transport Services (GTS) at a pressure of at least 60 bar.

Within Tata Steel IJmuiden, gas is normally supplied from the so-called 8-bar network, but deliveries with a higher supply pressure are also possible, such as deliveries for the gas turbines at Power Plant 1 (36 bar) and ENCI (22 bar).

High-calorific natural gas is supplied at the Tata Steel IJmuiden site. The agreement with Gasunie gives Gasunie the following delivery obligations regarding the quality:

- Wobbe index between 48.3 and 54.7 MJ/m_n^3, (this Wobbe index is the calorific upper value divided by the root of the relative density with respect to air).
- The content of hydrogen sulphide does not exceed 5 mg of sulphur per Nm^3.
- The total sulphur content does not exceed 150 mg per Nm^3.
- Composition: 80-95% methane, while the rest is: hydrocarbons, carbonic acid and nitrogen.

Calorific value is in practice between approx. 36 - 38 MJ/Nm^3.

Natural gas is very flammable; gas with air can be explosive. The gas is lighter than air and is, in principle, dry, non-aggressive and non-corrosive. The gas is non-toxic; the gas can have a suffocating effect in higher concentrations in air. The added odorant (injected into a 60-bar pipe before it is reduced to a lower pressure) gives the gas a warning odour.

Natural gas is used for industrial installations and comfort installations. The regulations for design and management used by Tata Steel must be complied with (see the relevant QHSE 5.23 Tata Steel Regulations).

Natural gas is also supplied and distributed in gas bottles by third parties. The application for these is gas welding.

4.2. Water vapour GB (Waterdamp)

4.4

CS1404	BTX
-	Granulation water vapour BF6

The BTX water vapor that occurs with the KGF 1 & 2 contains traces of BTX and therefore this chemical substances card is used.

4.3. Acetylene GC (Acetyleen)

CS0004	Acetylene

PROHIBITED without an exemption.

Acetylene is supplied by third parties in gas bottles.

Application: gas welding.

4.4. **Naphthalene vapour GD** (Naftalinedamp)

CS0071	Naphthalene

The naphthalene vapor contains traces of naphthalene and therefore this chemical substance card is used.

4.5. **Helium GE** (Helium)

4.4

CS0019	Helium, chilled, liquid

Helium is distributed in gas cylinders.

4.6. **DX gas GF** (DX-gas)

-	none

-

4.7. **Raw gas GG** (Ruwgas)

Due to different compositions of Raw gases there was separation for raw coke oven gas (GGK), raw blast furnace gas (GGH) and raw oxygas (GGO).

4.8. **Raw gas blast furnace gas GGH** (Ruwgas hoogovengas)

-	N/A

Raw gas is also the uncleaned blast furnace gas at the top of the blast furnace. After cleaning: see GH.

4.9. **Raw gas coke oven gas GGK** (Ruwgas kooksovengas)

-	N/A

Crude gases are the gases that are released when heating coal in the KGF1 & 2; it is still uncleaned. For cleaned coke oven gas, see GK.

4.10. **Raw gas oxygas GGO** (Ruwgas oxygas)

4.4

-	N/A

Crude gases are the gases that are released when making steel from crude iron in the basic oxygen steelfactory; it is still uncleaned. For cleaned oxygas, see GO.

4.11. Blast furnace gas GH (Hoogovengas)

4.4

CS0662	Blast furnace gas

Blast furnace gas is released during pig iron production in blast furnace 6 and 7. After treatment, it becomes available in the blast furnace gas distribution network.

The gas can be “enriched” at the enrichment stations with coke furnace gas, oxygas and/or natural gas. It can also be “depleted” by means of nitrogen injection.

Quality: The composition of the gas depends on the use of raw materials and the operation of the blast furnaces. A typical composition is:

- CO approx. 20 - 28 vol. %.
- H_2 approx. 3 - 8 vol. %.
- CO_2 approx. 20 - 25 vol. %.
- N_2 approx. 40 - 53 vol. %.

The gas is saturated with water vapour.

When starting and stopping a blast furnace, the composition deviates from the typical composition. The H_2 percentage can drop to 0 vol.%.

Pressure: 30 - 70 mbar.
Temp.: 20 - 30°C, but approx. 55°C when the blast furnace gas expansion turbines are out of operation.
If the gas has been enriched, the enrichment gases must also be taken into account in terms of gas composition, material choice, etc.

4.12. HNX gas (annealing gas) GI (Schermgas)

CS1942	Shielding gas (RTF furnace)

HNX gas is a gas that consists of nitrogen with a small percentage of hydrogen gas. The hydrogen gives the gas a high thermal conductivity, making the gas suitable for transferring heat at installations at TSP (CA11 & CA12) and the KBW (HNX annealing plant).

4.13. Carbon dioxide GJ (Kooldioxide)

CS0014	Carbon dioxide (pressuriser)
CS2244	Pretegon 18
CS6691	Liquid carbon dioxide

Carbon dioxide, chemical formula CO2, is a colourless and odourless gas. Carbon dioxide is released during the combustion of carbonaceous substances, such as the fossil fuels petroleum and natural gas. At Tata Steel, this substance is also created during various production processes.

4.14. **Coke oven gas GK** (Kooksovengas)

CS0201	Coke oven gas
CS7912	Coke oven gas residue

Coke oven gas is released at the cokesplants.
The gas is sent to the distribution network after treatment.
The composition of the gas depends on the quality of the coal used, among other factors.

Typical composition:

- H_2 approx. 60 vol. %.
- CH_4 approx. 25 vol. %.
- N_2, CO, CO_2 and heavy hydrocarbons: several vol. %.

The gas is saturated with water vapour.

Incidental substitute gas (see elsewhere) can be injected into the coke oven gas.

Distribution network:

- There are 2 network pressure parts: LD network of approx. 30 mbar and the so-called 0.3-bar network.
- Temperature: 20 - 50 °C.

The gas is non-corrosive and non-aggressive. The aromatic hydrocarbons must be taken into account when selecting seals. Viton and teflon, among others, are resistant to these hydrocarbons. Copper, aluminium and rubber parts may not be used, because the gas also contains NH_3 and sulphur compounds.

4.15. **Propane GL** (Propaan)

CS0111	Propane (pressuriser)

4.4

Propane is supplied by third parties and is mainly used as a vehicle fuel.

4.16. **Mixed gas GM** (Menggas)

CS9395	Combined gas (natural gas + air)
CS9480	Blastfurnacemixgascondensate

4.4

This code is used for various gas compositions. Among others for:

- Mixture of natural gas GA with combustion air LV (e.g. with WB2, TSP)

- Mixture of CO2 GJ with argon GR (including at TSTC).

4.17. **Ammonia vapour GN** (Ammoniakdamp)

CS0011	Ammonia
CS1983	Ammonia (25 - 50% ammonia in water)
CS1377	Ammonia water; coal water
CS0131	Ammonia (10 - 25% ammonia in water)
CS1982	Ammonia (5 - 10% ammonia in water)

It occurs as process flow at cokesplants and hot strip mill.

4.18. **Oxygas GO** (Oxygas)

CS0596	Oxygas

Oxygas is released during steel production in the oxysteel plant 2.

Typical composition:

- CO approx. 65 - 75 vol. %
- CO_2 approx. 15 vol. %
- N_2 approx. 15 vol. %
- O_2 less than approx. 2 vol. %
- H_2 approx. 1 - 2 vol. %, incidentally higher up to approx. 10 vol. %.

The gas is saturated with water vapour.

Distribution pressure: 0.07 to 0.27 bar. .
Temperature: 50 - 60 °C.

The gas or condensate has turned out to be slightly corrosive in recent years.
Dirt deposits can harden (becoming like concrete).
Application: enrichment of blast furnace gas, drying pellet ores.

4.19. **Process vapour GP** (Procesdamp)

CS1790	Eriochrome black T
CS0024	Hydrogen sulphide
CS1406	Sourgas

4.4

This code is used for gasses and damps with hazardous effects.

Typical process vapours are for H2S vapor.

EVB-SIF - Na2S Scrubbers

TSP - Pickling vapor, bichromate vapor, tinning vapor, oil vapor

OSF-DSF - Fenoldamp, N2

4.20. **Exhaust gas GQ** (Rookgas)

-	None

Exhaust gases are the gases after combustion in gas-consuming installations.

The composition depends on the combustion process and can contain CO.

4.21. **Argon GR** (Argon)

4.4

CS0013	Argon
CS1657	Aga Mison (Gas mixture)
CS2244	Protegon 18 (Gas mixture)
CS3814	Prodarc 2 (Gas mixture)
CS9206	IG-55 (Gas mixture)

Pure argon is supplied by Linde.

Argon contains the following when delivered by Linde:

< 100 ppm O_2,
< 100 ppm N_2.
Dew point under - 60 °C

Pressure: 13 - 18 bar.
Temperature: approximately the same as the ambient temperature.

Properties: colourless and odourless gas, heavier than air, non-toxic

Argon is a dangerous medium due to the risk of suffocation caused by the displacement of air.

The medium also occurs in pressure cylinders.

4.22. **Nitrogen GS** (Stikstof)

4.4

CS0025	Nitrogen (pressuriser)
CS0088	Nitric oxide (pressuriser)
CS0026	Nitrogen dioxide (pressuriser)
CS0100	NOx
CS0075	Ferrous Manganese Nitrogen dry
CS0891	Mixture of nitrogen and hydrogen (H2=< 5%)
CS5454	Span gas mixture, oxygen in nitrogen
CS5453	Span gas, methane in nitrogen
CS7762	Compressed gas mixture lighter than air, contains nitric oxide
CS9019	NO2 450PPMO2 1%N2 98,955%

Nitrogen is supplied by Linde.

Nitrogen contains the following when delivered by Linde:

< 20 ppm of oxygen.
Dew point under -70 °C.

The networks are as follows: 0.5 - 2 - 8 and 18 bar.
Temperature: approximately the same as the ambient temperature.

The network pressures are regulated by: pressure reduction, the adjustment of compressors and the start of the evaporator at the Linde factories.

In some cases, nitrogen piping systems are designed according to the oxygen regulations for cleanliness. This concerns applications where the nitrogen can eventually end up in an oxygen system.

4.23. **Nitrous oxide GSL** (Lachgas)

CS0030	Nitrous oxide

The molecular formula is N2O.

4.24. **Technical gas GT** (Technisch gas)

CS0069	Xylene (isomeric mixture)

This code is applied within the ENB code registration system. In principle, this code should be applied as little as possible. This code should only be chosen if no better coding is available.

4.25. **Substitute gas GU** (Substituutgas)

-	None

Substitute gas is made to replace coke furnace gas and consists of approx. 25 vol. % blast furnace gas and 75 vol. % natural gas. This gas can be injected into the coke furnace gas network.

4.26. **Enriched blast furnace gas GV** (Verrijkt hoogovengas)

-	See Blast Furnace Gas

Natural gas, coke furnace gas and/or oxygas are added to enriched blast furnace gas. The properties depend on the different enrichment stations.

4.27. **Hydrogen gas GW** (Waterstofgas)

CS0020	Hydrogen (pressuriser)

The gas is supplied by Linde. It is supplied through a steam reformer installation. Liquid hydrogen storage and H_2 trailer storage also exist as backup facilities for the hydrogen gas network.

Composition (Linde quality guarantees):

- H_2 min. 99.6 vol. %
- Ar + He max. 3000 ppm
- CnMn max. 5 ppm
- N_2 max. 300 ppm
- H_2O max. 1 ppm
- CO_2 max. 1 ppm.

Distribution pressure: 5.0 to 11.0 bar.

Hydrogen gas is used as a component of shielding gas for CPR, TSP (CA11 & CA12) and the KBW (HNX annealing plant). In the case of TSP (H2BA) and KWB (H2 annealing plant), the shielding gas consists of 100% hydrogen gas.

4.28. **Sulphur dioxide gas GX** (Zwaveldioxide gas)

CS0033	Sulphur dioxide (pressuriser)

It occurs as a process gas at Cokesplants.

4.29. **Sulphur trioxide gas GY** (Zwaveltrioxide gas)

CS0099	Sulphur trioxide, stabilised

It occurs as a process gas at Cokesplants.

4.30. **Oxygen GZ** (Zuurstof)

4.4

CS0031	Oxygen (pressuriser)
CS5454	Span gas mixture, oxygen in nitrogen

Oxygen is supplied by Linde.
The network is fed by oxygen plants 3, 4 & 5.
Composition of 22-bar and 8-bar network (Linde guarantees, network fed by oxygen plant 3 & 5):

- purity > 99.5 % O2, the rest is Ar
- contaminants:
- max. 100 ppm N_2
- max. 10 ppm H_2O
- max. 5 ppm CO_2
- max. 20 ppm of hydrocarbons.

Composition of 8-bar network (Linde guarantees, network fed from oxygen plant 4):

- purity > 95 % O2, the rest is N2 and Ar
- contaminants:
- max. 10 ppm H_2O
- max. 5 ppm CO_2
- max. 40 ppm of hydrocarbons

Temperature: approximately the same as the ambient temperature.

An oxygen content of 25% in the air (air normally contains 21% oxygen) will start to become dangerous and combustion can occur with explosive velocities in pure oxygen. Oxygen under high pressure connects with substances such as oil or grease so quickly that these substances combust explosively.

For maximum piping speeds and other design rules, see the relevant Tata Steel Standards for oxygen. In the case of new or modified oxygen systems, always contact the Oxygen Committee.

For more details, see the energy company's system guideline.

4.31. **Schwaden G1** (Schwaden)

CS1403	Schwaden

Is used at the cokesplants (KGF).

4.32. **Carbon monoxide G2** (Koolmonoxide)

CS0015	Carbon monoxide

Molecular formula CO

4.4

4.33. **Ozone G3** (Ozon)

CS00XX	Ozone

Ozone enriched oxygen, molecular formula O3, is used at the pellet factory DeNOx to clean flue gases with an typical weight percentage between 2 and 15%.

5. Coal K

When solid particles are transported by means of a liquid or gas through a line, then this combination is seen as a medium (also from the PED). The coding starts with the media code of the carrier followed by a slash / through the media code of the solid (s). Codes can be combined, here some examples:

Nitrogen / Calcium carbide GS/VC,

Liquid air / Phenolic resin LP/VF,

Nitrogen / Calcium carbide + Magnesium GS/VC+VM,

Nitrogen + Liquid air / Injection of coal GS+LP/KI (see chapter 5 for Coal (K))

A combination of solids or their carriers is indicated with a '+' sign. The slash '/' indicates the separation between carrier(s) and solid particle(s). If there are multiple carriers or solid particles then they will be placed in alphabetical order. For example: GS+LP or VC+VM.

5.1. **Activated carbon KA** (Actief Kool)

-	None

Is used at EVB-SIF

5.2. **Breeze KB** (Kolen)

-	None

-

5.3. **Bell-coke KC** (Bell-coke)

-	None

-

5.4. **Graphite KG** (Grafiet)

-	

5.5. **Injection of coal KI (after coal mill)** (Injectie kolen na kolenmolen)

CS0038	Anthracite
CS7068	Metallurgical coal

Is used at the blast furnaces.

5.6. **Coal KK (before coal mill)** (Kolen voor kolenmolen)

CS0038	Anthracite
CS7068	Metallurgical coal

Is used at the blast furnaces.

5.7. **Klaraid KL** (Klaraid)

4.4

-	None

Klaraid is an organic coagulant (polytannin) that works together with ferric chloride and traps colloidal particles in the acceleration process in the demineralisation plant.

5.8. **Cokes KO** (Kooks, metallurgische kooks)

4.4

CS7067	Metallurgical Cokes

The phase of coal between the Cokes and gas factory and blast furnaces

5.9. **HO gas substance KS** (Hoogoven gasstof)

4.4

CS6824	Blast furnace gas dust (dust bag dust)

-

5.10. **Warf-coke KW** (Warf-coke)

-	None

-

6. AIR L

6.1. **Vacuum LA** (Vacuüm)

-	None

Vacuum is defined as the absence of air and occurs in condensers.

6.2. **Outside air LB** (Buitenlucht)

-	None

Air from outside or inside the factory which flows thru a pipe to for example an compressor.

6.3. **Conditioned air LC** (Geconditioneerde lucht)

-	None

Conditioned air is air that has been treated by an air treatment installation or something similar, resulting in the air having e.g. a constant air humidity or temperature.

6.4. **Instrument air LI** (Instrumentenlucht)

-	None

Instrument air is obtained by compressing atmospheric air, and then cooling it, drying it and making it dust-free.
Distribution pressure & temperature are installation-dependent.

Properties: dry, dust-free air, a dew point of -20°C when using an absorption dryer, a dew point of +2°C when using cooling units.
If desired, it can be conditioned with regard to oil content.

6.5. **Hot wind LH** (Hete wind)

-	None

After the wind heaters the hot wind is transported via the piping “Hot wind pipes” to blast furnace 6 or 7.

6.6. **Cooling air LK** (Koellucht)

-	None

-

6.7. **Breathing air LL** (Leeflucht)

-	None

Air conditioned for breathing purposes. It occurs at the Energy Distribution Station.

6.8. **Compressed air LP** (Perslucht)

CS0007	Compressed air

Compressed air is obtained by compressing and drying atmospheric air.

There is a general network (5.5 - 7.0 bar) and a specific network for coal injection (12 – 17[2]

baro).
Temperature: < 40°C.

Compressed air may not be used as breathing air. Nowadays the properties of compressed air are sufficient to function as instrument air.

[2]) in some installations the letter H is added after the code LP. The media code becomes LPH to indicate the high pressure compressed air. The exact pressure and if the letter H is added differs per installation.

For more details on compressed air, see the energy company's system guideline.

6.9. **Waste air LS** (Afvallucht)

-	None

This medium code can be used for exhaust pipes, vent pipes etc. and only for non-hazardous vapours.

If the air is noxious, use the medium code GP..

6.10. **Combustion air LV** (Verbrandingslucht)

-	None

Outdoor air, drawn in for combustion purposes. Depending on the location, a dust load and gaseous contaminants must be taken into account.

6.11. **Cold wind LW** (Koude wind)

-	None

Wind is compressed air produced in Power Plant 2 of ENB. Five steam-driven wind machines are installed in the power plant. If these machines cannot supply sufficient air, extra air can be added by means of 3 permanently installed compressed air lines.

The cold wind is transported by means of two so-called "cold wind pipes" to the hot-blast stoves. Before the wind reaches the hot-blast stoves, oxygen is added via 3 injection lines per cold wind pipe. After the hot-blast stoves, the hot wind (LH) goes to Blast Furnace 6 or 7 via the "hot wind pipes".

For more details, see the energy company's system guideline.

6.12. **Purging air LX** (Spoellucht)

4.4

-	None

Air used for expelling nitrogen, blast furnace gas or a different gas from a pipe in order to allow work to be done in/on this pipe. Clean outside air which can be used for the extracting or expelling dust towards the cleaning filter or installations.

7. OIL O

7.1. **Waste oil and/or emulsion OA** (Afval olie en/of emulsie)

CS2725	Kemet diamond emulsion, type WA
CS3521	Coratex Treatment Emulsion

Medium, as transported to central waste processing company (WMA).

For specific properties and other applications of this substance, information must be obtained from users and/or administrators of installations related to this substance.

7.2. **Petrol OB** (Benzine)

4.4

CS0046	Petrol
CS3296	Universal solution CE0209 (boiling point petrol)
CS2817	Petroleum gasoline (boiling point 40-60 gr C)
CS0151	White gas
CS7898	Petroleum gasoline (boiling point 60-80 gr C)

-

7.3. **Dirty oil OC (**Vuile olie)

-	None

-

7.4. **Gas oil OG** (Gasolie)

CS0045	Diesel oil

Gas oil/diesel oil is supplied by third parties and used as motor fuel. The composition differs, depending on specifications.

7.5. **Hydraulic oil OH** (Hydrauliek olie)

4.4

CS0532	Echina 30
CS3800	Echina 52, 100
CS6840	Falcon Kestrel 46
CS7033	Echina 17,30
CS7596	Echina K
CS7756	Azolla ZS-46
CS8746	Echina NEVASTANE
CS9693	Echina ZS 17
CS9694	Echina ZS 10
CS6840	Falcon Kestrel 46

Hydraulic oils are purchased from third parties and are used in hydraulic systems.

7.6. **Rolling oil OL** (Walsolie)

4.4

CS2200	Rolling oil can sludge KW 11 and 12
CS7959	Rolkleen 1375

It is supplied by third parties and used in cold strip mills.

7.7. **Tinol ON** (Tinol)

4.4

-	None

Rolling oil of the Tinol brand used to be used in KW11 and 12. It is no longer used today.

7.8. **Palm oil OP** (Palmolie)

-	None

-

7.9. **Lubricating oil OS** (Smeerolie)

4.4

Due to the largely extended list, contact the specialists on the department:
OPS ESS PTC MCE VGS or OPS ESS HTD LOC TSO

Lubricating oils are supplied by third parties and used for the lubrication of transmission equipment, machines, mechanically moving parts, etc. Properties are highly dependent on usage.

7.10. **Thermal oil OT** (Thermische olie)

4.4

Due to the largely extended list, contact the specialists on the department:
OPS ESS PTC MCE VGS or OPS ESS HTD LOC TSO

These oils are purchased from third parties and used for the transport of heat in piping systems.

7.11. **Grease oil OV** (Vetsmeerolie)

4.4

Due to the largely extended list, contact the specialists on the department:
OPS ESS PTC MCE VGS or OPS ESS HTD LOC TSO

-

7.12. **Wax oil OW** (Wasolie)

CS1405	BTX wax oil

Wax oil is used in coke furnace gas treatment to extract naphthalene.

7.13. **Sludge oil OX** (Slibolie)

-	None

-

8. STEAM S

8.1. **Steam condensate SC** (Stoomcondensaat)

-	None

Steam can condense into steam condensate. Only the condensate from the steam turbines of Power Plant 1 and 2 is reused. There is no return of condensate to the Demineralisation Plant for the condensed steam from the steam networks. There is a so-called “open system”.

Ammonia is added to condensate that is reused, causing the pH to rise to approx. 9 and the conductivity to 3.5 to 5 mS/cm.

8.2. **Steam > 40 - 80 bar SH** (Stoom > 40 - 80 bar)

-	None

High-pressure steam is characterised as follows: 72-bar working pressure and 510 - 535°C.

High-pressure steam in Power Plant 1 is used to power the turbine generators of Power Plant 1 and to supply the 40-bar network at Power Plant 2.

8.3. **Steam 0.5 - < 2 bar SK** (Stoom 0.5 -< 2 bar)

-	None

0.5-bar steam of approx. 220 C. (the max. temperature in the Demineralisation Plant is 180°C).

Used for degassers in Power Plant 1 and 2, and for heating Lek water in the demineralisation plant.

8.4. **Steam 2 - < 15 bar SL** (Stoom 2 - < 15 bar)

-	None

There are a number of low-pressure steam networks, namely

- a 3.5-bar network at the north site, Power Plant 3. approx. 130°C, which is also fed by the boilers of the coating line.

8.5. **Steam 15 - 40 bar SM** (Stoom 15 – 40 bar)

-	None

Medium-pressure steam is characterised as follows:

- 15-bar network of Power Plant 1, 330-350 °C
- 15-bar network of Power Plant 2, 330-350 °C
- 45 bar and 475 °C.

15-bar steam is used to power the steam turbines of the gas pistons at Cokesplant 1, for heating lye valves and for area heating in the demineralisation plant and other heating

purposes. 45-bar steam is supplied by Power Plant 2 (Boilers 23 and 24), Power Plant 4 (Boiler 41) and by disconnecting steam from Steg IJmond-01 (NUON), and is used for such purposes as powering the steam turbines of the so-called wind machines 21 to 25 for Blast Furnace 6 and 7, and the so-called gas pistons at Cokesplant 2.

9. SOLIDS V (Vaste stoffen)

When solid particles are transported by means of a liquid or gas through a line, then this combination is seen as a medium (also from the PED). The coding starts with the media code of the carrier followed by a slash / through the media code of the solid (s). Codes can be combined, here some examples:

Nitrogen / Calcium carbide GS/VC,

Liquid air / Phenolic resin LP/VF,

Nitrogen / Calcium carbide + Magnesium GS/VC+VM,

Nitrogen + Liquid air / Injection of coal GS+LP/KI (see chapter 5 for Coal (K))

A combination of solids or their carriers is indicated with a '+' sign. The slash '/' indicates the separation between carrier(s) and solid particle(s). If there are multiple carriers or solid particles then they will be placed in alphabetical order. For example: GS+LP or VC+VM.

9.1. Aluminum VA (Aluminium)

Solid Aluminum. Raw materials are used for refractory brick production. Depending on the phase in the process, additives such as hexamethylenetetramine and graphite have also been added. Different compositions are therefore possible, main components: Aluminum oxide, Aluminum phosphate, Hexamethylene tetramine, magnesite and any harmless fillers.

9.2. Beeze of sinter and pellets VB (Bries van Sinter en Pellets)

Is used in the blast furnace process.

9.3. Calcium carbide VC (Calciumcarbide)

Molecular formula:CaC2

9.4. Calcium carbonate VCC (Calciumcarbonaat)

Molecular formula: CaCO3

CS0023	Calcium carbonate
CS8339	Calcium carbonate, natural / limestone

9.5. Ore materials VE (Ertsstoffen)

Various ores example: ore flour ruthner oxide and bentonite.

9.6. **Phenolic resin VF** (Fenolhars)

Solid substance Phenolic resin is a raw material which is used with the DSF as a binder for refractory bricks. Phenolic vapor and condensate are released during the baking process.

9.7. **Magnesium VM** (Magnesium)

4.4

-	None

Solid Magnesium or variants thereof such as Magnesite.

9.8. **Oxygen scavenger VO** (Zuurstofvanger)

4.4

Solid particles used for conditioning of media.

9.9. **Pellets VP** (Pellets)

4.4

CS6859	Tatasteel iron pellets

Production in the Pellet factory.

9.10. **Scrap VR** (Schrot)

4.4

-	Geen

Recycling of metals for example in the Hisarna or basic oxygen steel factory.

9.11. **Sinter VS** (Sinter)

4.4

CS6828	Tatasteel iron Sinter

Production in the Sinter factory.

9.12. **Titanium VT** (Titanium)

CS8045	Titanium IV oxide

Substance is used at Blast Furnace.

9.13. **Undefined substances VX** (Ongedefinieerde processtoffen)

4.4

A mix of various undefined substances that are extracted, collected and filtered from the process. At the BF this is a combination of material consisting of ore dust and various additives that are used to make pig iron.

9.14. **Sand VZ** (Zand)

Solid sand.

10. WATER TYPES W

10.1. **A-water WA** (A-water)

A-water is produced in the demineralisation process at Power Plant 1. This water has been through the cold lime softening (KKO) process, a cation filter and an anion filter. A-water is used by all operating units and three external customers (Hocochrome, Linde Gas and AROC). A-water is used in various processes, including: boiler feed water for low pressure and medium pressure boilers, rinsing/quenching water in the pickling, tinning and dyeing lines, for the production of hydrogen gas and as a cooling medium for machines and electrical components.

Note: during the deactivation and activation of an anion filter (approx. 1x in 4 hours), a short-term disturbance of the pH value occurs.

10.2. **Brackish water WB** (Brak water)

Brackish water is pumped up from Staalhaven. It serves as granulation water for the blast furnaces and is used as cooling water at the central waste processing company (WMA) and International Flame Research (IVO).

Properties:

- pH acidity level: approx. 7.5
- chloride content: approx. 2,500 mg/l
- floating dirt: a large amount.

The temperature depends on the season and the cooling water discharge of NUON units (at the start of the Staalhaven) with a max. of 35°C.

10.3. **Condensate WC** (Condensaat)

-

10.4. **Drinking water WD** (Drinkwater)

Drinking water is purchased from third parties. It is used for consumption and sanitary purposes, emergency showers and/or eye baths.

Properties:

- pH acidity level: approx. 7.5
- chloride content: max. 300 mg/l
- floating dirt: minimal
- the temperature depends on the season: 5-20°C.

Pressure: at least 3.2 bar with respect to the NAP.
The drinking water and the piping system must comply with legal requirements.

10.5. **Seawater WE** (Zeewater)

Seawater is only pumped up from the outer port. It is mainly used for the direct and indirect cooling of the blast furnaces and condensers; in addition, it is also used as emergency supplementation water for the slag granulation systems at the blast furnaces.

Properties:

- pH acidity level: approx. 7.5
- chloride content: approx. 12,000 mg/l
- floating dirt: a large amount.

The temperature varies from 5 - 23°C, depending on the season and the tide.

10.6. **Ammonia water WF** (Ammoniakwater)

CS1377	Ammonia water,
CS1983	Ammonia (25 – 50% Ammonia in water)
CS0131	Ammonia (10 – 25% Ammonia in water)
CS1982	Ammonia (5 – 10% Ammonia in water)

Ammonia water is used for the cooling of the hot, untreated coke furnace gas produced from the batteries of KGF 1 and 2. This water is injected into the so-called ascension pipe bend (per battery chamber). Dirt and tar residues from the cooled KO gas are removed with the residual water. It is then called battery water (code WY). Dirt and tar are extracted from the battery water in the tar separation process. It is then called ammonia water and is subsequently injected back into the batteries.

This water contains variable amounts of dissolved ammonia.
Battery supply pressure: approx. 3 bar at a temperature of approx. 25°C.

Coal water (code WN) also occurs in this respect: residual water from KGF 1 and 2, which is sent to biological treatment.

10.7. **G-water WG** (G-water)

G-water is Lek water that has been treated in the demineralisation process, in which the colloidal particles, solid particles and 30% of the salts present are removed by means of coagulation, precipitation and flocculation. The temporary hardness is also eliminated by administering calcium hydroxide. G-water is not purchased and is an intermediate step in the demineralisation process.

10.8. **Rainwater WH** (Hemelwater)

In the case of installations that are shielded from the groundwater, rainwater is collected and used in the process.

In use at Cokesplant 1.

10.9. De-acidified water WI (Ontzuurd water)

CS1407	De-acidified water

Substance is used at KGF 1.

10.10. Jacket cooling water WJ (Jacketkoelwater)

-

10.11. Cooling water, hearth cooling water or K-water WK (Koelwater, haardkoelwater)

Fresh water (WL) is added to installations with a circulating cooling water system. In the circulating system, various substances are added for conditioning, creating cooling water.

Hearth cooling water is furnace cooling water.

K-water is water between the cation filters and the anionfilters in the demineralisation plant. This water has a very low pH value and the interior of the piping must therefore be provided with an ebonite layer or be made of plastic. K-water is not purchased and is an intermediate step in the demineralisation process.

10.12. Fresh water (Lekwater / WRK-water) WL (Zoetwater, lekwater, WRK-water)

CS # Not applicable	This medium is not classified as dangerous for the environment

Fresh water comes from the river Lek and/or from the IJsselmeer, and is supplied by the company Watertransportbedrijf-Rijn-Kennemerland (WRK). Freshwater is therefore also called WRK water or Lek water. Before it is transported to Tata Steel IJmuiden, it is flocculated and filtered.

Fresh water is used:

- as general process water;
- in various cooling systems;
- as a basis for the demineralisation process;
- for fire extinguishing systems.

Properties:

- pH acidity level: approx. 7
- total hardness: 2.5 mmol/l
- chloride content: 300 mg/l
- floating dirt: < 2 mg/l.

The temperature depends on the season, but it can reach a max. of 23°C and the pressure can reach a min. of 3.2 bar with respect to NAP.

10.13. **M-water WM** (M-water)

M-water is produced in the demineralisation process of Power Plant 1. This water has gone through the KKO (cold lime softening) process, a cation filter, an anion filter and a mix-bed filter. M-water is mainly used as boiler feed water for high-pressure boilers at the energy company and the oxygen steel plant, but also in various processes at the cokesplants. Ammonia has been added to the M-water to increase the pH value in order to protect the magnetite layer in the boilers.

10.14. **Coal water WN** (Kolenwater)

CS1377	Ammonia water; coal water

Coal water is the surplus ammonia water that is sent to biological treatment after separation in Cokesplant 1 and 2.

This water contains variable amounts of dissolved ammonia.
Battery supply pressure: approx. 3 bar at a temperature of approx. 20°C.

10.15. **Softened water WO** (Onthard water)

Softened water is obtained from fresh water treated in the water softening installation of the energy company. Softened water is mainly used as rinsing water at the tinning plant.

Quality: softening is an ion exchange process in the Na+ cycle. This means that the quality of softened water is equal to the currently supplied Lek water, in which Ca_2+ and Mg_2+ ions are replaced by Na+ ions. Ca_2+ and Mg_2+ are the hardness formers. The quality of the supplied softened water is monitored by measuring the content of $CaCO_3$. The $CaCO_3$ content is always lower than 20 ppm (1.12 German degrees).

10.16. **Process water or HO gas/KO gas/OXY gas condensate WP** (Proceswater of HO-gas-/KO-gas-/OXY-gas-condensaat)

CS1704	Blast furnace gas condensate
CS1705	Coke furnace gas condensate
CS1703	Oxygas condensate

WP is used as a code for contaminated condensate at various installations.

Process water is generated in various processes, after which it is reused in the same process. This occurs in Cokesplant 1, among other places.

The code WP is also used for the condensate flows at the Energy Company (coke gas condensate, blast furnace gas condensate and oxygas condensate).

10.17. **Dry fire WQ** (Droge brand)

-

10.18. **Contaminated water WR** (Verontreinigd water)

Water that is reused in the process after it has been cleaned at the work unit itself. Due to its composition, this water is not suitable for discharge into surface water.

10.19. **Silt water / shaft cooling water WS** (Slikwater / schachtkoelwater)

-

10.20. **Salt water WT** (Zoutwater)

CS # Not applicable	This medium is not classified as dangerous for the environment

-

10.21. **Salt spring water WU** (Zout bronwater)

Salt spring water is pumped up from the deeper soil layers. It is used for special cooling purposes for which a constant low temperature is important.

Properties:

- pH acidity level: approx. 7.5
- chloride content: approx. 16,000 mg/l

Note: salt spring water is oxygen-free and contains iron. The iron flocculates with aeration. Furthermore, it contains anaerobic bacteria, which makes it highly corrosive. Special precautions must therefore be taken to prevent deterioration of material.

10.22. **Boiler feed water WV** (Ketelvoeding water)

Steam condensate and/or demineralised water is used to produce boiler water independently in installations with a separate degasser.

In use at Cokesplant 1 and the energy company, among other places.

10.23. **Rolling cooling water WW** (Walsenkoelwater)

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10.24. **Waste water WX** (Afvalwater)

Waste water is also called dirty water. The composition changes depending on the process. Various waste water streams are pre-treated at the work unit itself or at the central waste processing company (WMA) before the water becomes suitable for reuse and/or is discharged into the surface water.

10.25. **Waste water permeate WXP** (Afvalwater permeaat)

Used with WMA. The emulsions are separated in the emulsion center by ultrafiltration into a water (permeate) and oil phase. The waste water is biodegraded and discharged.

10.26. **Battery water WY** (Batterijwater)

CS1377	Battery water

Battery water is created when ammonia water is used for cooling the hot, untreated coke furnace gas from the batteries of KGF 1 and 2. This water is injected into the so-called ascension pipe bend (per battery chamber). Dirt and tar residues from the cooled coke furnace gas are discharged with the residual water. Dirt and tar are extracted from the battery water in the tar separation process. It is then called ammonia water (code WF) and is subsequently re-injected into the batteries.

This water contains variable amounts of dissolved ammonia.
Supply pressure: approx. 3 bar at a temperature of approx. 80°C.

Coal water (code WN) also occurs in this respect: residual water from Cokesplant 1 and 2, which is sent to biological treatment.

10.27. **Acid water WZ** (Zuurwater)

CS1407	Acid water

11. Other

11.1. **C&A water AA** (C&A water)

Code used within the energy company
(it comes from the ENB code registration system)

11.2. **General chemicals AC** (Algemeen chemicaliën)

Code used within the energy company
(it comes from the ENB code registration system)

11.3. **General AL** (Algemeen)

Code used within the energy company
(it comes from the ENB code registration system)

11.4. **Exchanger grains AW** (Wisselaarskorrels)

Code used within the energy company
(it comes from the ENB code registration system)

11.5. **Electricity EL** (Elektriciteit)

Code used within the energy company
(it comes from the ENB code registration system)

11.6. **Energy (no specific medium) EN** (Energie)

Code used within the energy company
(it comes from the ENB code registration system)

11.7. **Process component PD** (Procesdeel)

Code used within the energy company
(it comes from the ENB code registration system)

11.8. **Trial medium TS** (Testmedium)

Code used within the energy company
(it comes from the ENB code registration system)

11.9. **Salt ZO** (Zout)

Code used within the energy company
(it comes from the ENB code registration system)

11.10. **LPG ZZ** (LPG)

CS0109	LPG

12. ANNEX: OVERVIEW OF CODES

LIST OF MEDIUM NAMES	
Chemicals C	
CA	Chemical waste
CB	Chlorine bleach lye
CC	Soda
CD	Citric acid
CE	Electrolytic parafenolsulfonic acid
CF	Phosphoric acid
CG	Freon
CH	Hydrazine
CI	MEA (fresh)
CJ	MEA (solution)
CK	Biotex
CL	Caustic soda
CLK	Potassium hydroxide
CM	Ammonium sulphate solution
CN	Ammonium sulphate slurry
CO	Conditioning
CP	Parafenolsulfonic acid
CPF	Flux
CPM	Methane sulfonic acid
CQ	Lithium bromide
CR	Chromic acid
CRS	Chromium sulphate
CS	Liquid sulphur
CT	Sodium dichromate
CTF	Sodium formate
CTS	Sodium sulphate
CTU	Sodium sulphide
CU	Hydrochloric acid
CV	Urea
CW	Anti-foam/oxidation
CX	BTX
CY	Lithium bromide weak solution
CZ	Sulphuric acid
Various D	
DA	Waste
DB	Sludge
DC	Chlorine
DD	Drainage water
DE	Biocide
DF	Ferric (III) chloride
DG	Glycol

4.4

DH	Wood flour slurry
DI	Isopropanol
DJ	Corrion inhibitor
DK	Calcium hydroxide
DKO	Calcium oxide
DM	Liquid ammonia
DN	Nalco
DOK	Degreasing agent KB35
DP	Polymer
DS	Formaldehyde
DT	Coal tar
DV	Liquid sugar products
DZ	Ammonium sulphate
Gases G	
GA	Natural gas
GB	Water vapour
GC	Acetylene
GD	Naphthalene vapour
GE	Helium
GF	DX gas
GG	Raw gas
GGH	Raw gas blast furnace gas
GGK	Raw gas coke oven gas
GGO	Raw gas oxygas
GH	Blast furnace gas
GI	HNX gas (annealing gas)
GJ	Carbon dioxide
GK	Coke oven gas
GL	Propane
GM	Mixed gas
GN	Ammonia vapour
GO	Oxygas
GP	Process vapour
GQ	Exhaust gas
GR	Argon
GS	Nitrogen
GSL	Nitrous oxide
GT	Technical gas
GU	Substitute gas
GV	Enriched blast furnace gas
GW	Hydrogen gas
GX	Sulphur dioxide gas
GY	Sulphur trioxide gas
GZ	Oxygen
G1	Schwaden
G2	Carbon monoxide
G3	Ozone

Coal K	
KA	Activated carbon
KB	Breeze
KC	Bell-coke
KG	Graphite
KI	Injection of coal (after coal mill)
KK	Coal (before coal mill)
KL	Klaraid
KS	HO gas substance
KW	Warf-coke
Air L	
LA	Vacuum
LB	Outside air
LC	Conditioned air
LH	Hot wind
LI	Instrument air
LK	Cooling air
LL	Breathing air
LP	Compressed air
LS	Waste air
LV	Combustion air
LW	Cold wind
LX	Purging air
Oil O	
OA	Waste oil and/or emulsion
OB	Petrol
OC	Dirty oil
OG	Gas oil
OH	Hydraulic oil
OK	Fuel oil
OL	Rolling oil
ON	Tinol
OP	Palm oil
OS	Lubricating oil
OT	Thermal oil
OV	Grease oil
OW	Wax oil
OX	Sludge oil
Steam S	
SC	Steam condensate
SH	Steam > 40 - 80 bar
SK	Steam 0.5 - < 2 bar
SL	Steam 2 - < 15 bar
SM	Steam 15 - 40 bar

Solids V	
VA	Aluminium
VB	Breeze of sinter and pellets
VC	Calcium carbide
VCC	Calcium carbonate
VE	Ore materials
VF	Phenolic resin
VM	Magnesium
VO	Oxygen scavenger
VP	Pellets
VR	Scrap
VS	Sinter
VT	Titanium
VX	Undefined substances
VZ	Sand
Water W	
WA	A – Water
WB	Brackish water
WC	Condensate (no steam condensate)
WD	Drinking water
WE	Seawater
WF	Ammonia water (after pre-separation)
WG	G – Water
WH	Rainwater
WI	De-acidified water
WJ	Jacket cooling water
WK	Cooling water, hearth cooling water or K-water
WL	Fresh water (Lekwater / WRK-water)
WM	M-water
WN	Coal water (after post-separation)
WO	Softened water
WP	Process water or HO gas/KO gas/OXY gas condensate
WQ	Dry fire
WR	Contaminated water
WS	Silt water / shaft cooling water
WT	Salt water
WU	Salt spring water
WV	Boiler water
WW	Rolling cooling water
WX	Waste water/Dirty water
WXP	Waste water permeate
WY	Battery water
WZ	Acid water
Other	
AA	C&A water

AC	General chemicals
AL	General
AW	Exchanger grains
EL	Electricity
EN	Energy (no specific medium)
PD	Process component
TS	Trial medium
ZO	Salt
ZZ	LPG

13. REFERENCES

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R1300401 – Handleiding besluit drukapparatuur

14. DECLARATION

Version 1.0 up to 3.0

No English versions are available.

Version 4.0:

This document is the English version of the Dutch: Media definiëringen rev. 4.0.

Version 4.1:

Following PPIR / HSE REFOCUS, a large number of changes were made, these are indicated in the margin through the revision triangle.

Version 4.2:

Revision on combinations of codes with solids.

Version 4.3:

Changed UN to CS cards, removed unused UN & CS cards, and added: DI Isopropanol, DV Liquid sugar products See revision triangle.

Versie 4.4:

Inactive Chemical Substance Cards removed. Media Biocide DE, Corrosion inhibitor DJ, BTX Water vapour GB changed to Water vapour GB, Raw gas Oxygas GGO, Ozone G3 added, Steam 40 bar to 50 bar due to set pressure of the safety valve, Cokes KO, Breeze of Sinter and Pellets VB, Oxygen scavenger VO, Pellets VP, Scrap VR, Sinter VS, and undefined substances VX added. Definition purge air LX expanded.