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tab 11

Toets Best Beschikbare Technieken
Vopak Terminal Westpoort B.V.

Vopak Oil Europe, Middle East & Africa B.V.

September 2007
Definitief rapport
9S2432.01

Vopak

Vopak

A COMPANY OF

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Vopak

ROYAL HASKONING

INHOUDSOPGAVE

1 INLEIDING

1.1 Inleiding

Vopak Oil Europe, Middle East & Africa B.V. (hierna Vopak Oil EMEA), heeft het voornemen een nieuwe tankterminal te ontwikkelen gelegen aan de Afrikahaven te Amsterdam voor de op- en overslag van vloeibare olieproducten. Deze terminal krijgt de naam Vopak Terminal Westpoort B.V. (afgekort VTW). De voornaamste producten die zullen worden opgeslagen zijn benzine, diesel, gas olie en hun componenten, alsmede niet verwarmbare biobrandstoffen.
De terminal zal producten en componenten opslaan die met zeeschepen en binnenvaartschepen worden aan- en afgevoerd; additieven worden over de weg aangevoerd. Butaan wordt over de weg en het water aangevoerd. De beoogde opslagcapaciteit zal circa 1.120.000 m^3 en de jaarlijkse doorzet circa 20 miljoen m^3 bedragen.

1.2 Achtergrond

De EU Richtlijn 96/61/EG van 24 september 1996 betreffende geïntegreerde preventie en bestrijding van verontreiniging (Integrated Pollution Prevention and Control - IPPC) verplicht het bevoegd gezag de milieueffecten van bedrijfsvoering integraal te beoordelen. Deze geïntegreerde preventie en bestrijding van verontreiniging omvat alle milieucompartimenten waaronder lucht, bodem, water, afvalstoffen, externe veiligheid, geluid, trillingen, energie en milieuzorg. Deze richtlijn heeft in principe alleen betrekking op de in bijlage I bij de Richtlijn aangemerkte installaties. De activiteiten van Vopak Terminal Westpoort, op- en overslag van minerale olieproducten, zijn niet aangemerkt als installaties waarop de Richtlijn van toepassing is. In de Wet milieubeheer is opgenomen dat aan Best Beschikbare Technieken (BBT) zal worden getoetst.

Het bedrijf dient milieueffecten te voorkomen, dan wel te beperken door toepassing van de BBT. Het gaat hier om technieken die de beste bescherming voor het milieu bieden en waarvan is vastgesteld dat deze technisch en economisch toegepast kunnen worden in een bepaalde sector. De BBT's zijn beschreven in BBT Reference Documents (BREF's), die betrekking hebben op de bedrijfstak of een onderdeel uit een productieproces.

De IPPC-richtlijn is vanaf 30 oktober 1999 van toepassing. Bij nieuwe vergunningaanvragen voor het oprichten, veranderen of belangrijk wijzigen van installaties binnen het bedrijf moeten deze direct aan de BBT worden getoetst. Bestaande inrichtingen moeten per 1 oktober 2007 aan de IPPC-richtlijn voldoen.
Voor Vopak Terminal Westpoort (VTW) zijn de volgende BREF's van belang:

- het BREF document "Emissions from storage" van juli 2006;
- het BREF document "Common waste water and waste gas treatment/management systems in the chemical sector" van februari 2003;
- het BREF document "Mineral oil and gas refineries" van februari 2003;
- het BREF document "General principles of monitoring" van juli 2003;
- Het BREF document "Energy efficiency Techniques" van april 2006 ;
- het BREF document "Economics and cross-media effects" van juli 2006.

In dit rapport zijn de resultaten toetsing van VTW aan de relevante onderdelen uit de verschillende BREF's gepresenteerd.

1.3 Leeswijzer

De resultaten van de toetsing aan de hiervoor genoemde BREF's gepresenteerd in hoofdstuk 2.
Voor elk BREF is eerst een overzicht gegeven van de Beste Beschikbare Technieken (of BAT: Best Available Techniques) en vervolgens is de uitvoering van de VTW hieraan getoetst. De toetsing aan de verschillende BREF's is in de paragrafen en relevante bijlagen behandeld:

- Paragraaf 2.1: Emissions from storage
- Paragraaf 2.2: Common waste water and waste gas treatment/management systems in the chemical sector";
- Paragraaf 2.3: Mineral oil and gas refineries;
- Paragraaf 2.4: Energy efficiency Techniques;
- Paragraaf 2.5 General principles of monitoring;
- Paragraaf 2.6: Economics and cross-media effects.

In hoofdstuk 3 is de algemene conclusie van de toetsing gepresenteerd alsmede een overzicht van geconstateerde afwijkingen en motivatie hiervan.

2 TOETSING AAN DE DIVERSE BREF'S

2.1 BREF "Emissions from storage"

In hoofdstuk 5 van het BREF "Emissions from storage" worden de voor VTW relevante BBT beschreven:

- 5.1: Storage of liquids and liquefied gases;
- 5.2: Transfer and handling of liquids and liquefied gases.

In bijlage 1 van dit rapport is een beknopt overzicht gegeven van de BBT waaraan inrichtingen voor op- en overslag van vloeibare brandstoffen dienen te voldoen op basis van het BREF-document "Emissions from storage".

2.2 BREF "Common waste water and waste gas treatment/management systems in the chemical sector"

In hoofdstuk 4 van het BREF "Emissions from storage" worden de voor VTW relevante BBT beschreven:

- 4.2: General BAT;
- 4.3: Specific BAT.

In bijlage 2 van dit rapport is een beknopt overzicht gegeven van de BBT waaraan afvalwaterzuiverings- en dampverwerkingsinstallaties dienen te voldoen op basis van het BREF "Common waste water and waste gast treatment".

2.3 BREF "Mineral oil and gas refineries"

Het BREF "Mineral oil and gas refineries" is van toepassing op olie- en gasraffinaderijen. VTW is een opslagtank terminal en valt buiten de scope van dit BREF. Desalniettemin worden in het BREF een aantal BBT genoemd die als richtlijn gebruikt kunnen worden voor opslagtank terminals zoals VTW. Daarom is het betreffende BREF beschouwd.

In hoofdstuk 5 van het BREF "Mineral oil and gas refineries" worden de voor VTW relevante BBT beschreven:

- 5.2: BAT for process/activity.

Opgemerkt wordt dat in dit BREF verwezen wordt naar het BREF "Emissions from storage", aan dit BREF is getoetst in paragraaf 2.1.

In bijlage 3 van dit rapport is de BBT beschreven waar VTW bij het ontwerp en de realisatie van de nieuwe terminal aan moet voldoen op basis van het BREF "Mineral oil and gas refineries".

2.4 BREF "Energy efficiency Techniques"

In hoofdstuk 5 van het BREF "Energy efficiency techniques" worden de voor VTW relevante BBT beschreven:

- 5.1: General best practices;
- 5.2: Energy efficiency indicators;
- 5.4.5: Electric motor drive systems;
- 5.4.7: pumping systems.

In bijlage 4 van dit rapport is de BBT beschreven waar VTW bij het ontwerp en de realisatie van de nieuwe terminal aan moet voldoen op basis van het BREF "Energy efficiency tecniques".

2.5 BREF "General principles of monitoring"

2.5.1 Inleiding

Voor de toetsing van het BREF 'General principles of monitoring' is de definitieve versie van het betreffende BREF-document van juli 2003 gebruikt (Code MON).
Het MON betreft een horizontaal BREF document en is van toepassing op vele bedrijfstakken. Het heeft vooral betrekking op de bepaling welke parameters gemonitored moeten worden, wie het doet, hoe het gebeurt en de opzet van de rapportage.

Als achtergrond voor de toetsing wordt gewezen op de verschillende voorschriften op het gebied van monitoring van emissies bij de tank op- en overslag in Nederland, te weten:

- Nederlandse emissie richtlijn (Ner);
- IMKO-2.

Tevens wordt erop gewezen dat het bedrijf milieuzorgsysteem zal implementeren met daarin ook een paragraaf over monitoring. Hierin zal aandacht besteed worden aan procedures voor:

- Kwantificeren totale emissies;
- Data productie keten;
- Toetsing regelgeving;
- Rapportage.

2.5.2 Toetsing

Kwantificeren totale emissies

Minimaliseren emissiepunten

Om het management van de totale emissie te faciliteren kan het aantal emissiepunten geminimaliseerd worden, bijvoorbeeld door kleine emissie punten naar hoofdsystemen te leiden. Dit helpt om het aantal emissiepunten te limiteren.

De activiteiten van VTW zijn zodanig ontworpen dat het aantal mogelijke emissiepunten, waar mogelijk wordt beperkt dan wel maatregelen worden getroffen de emissies via deze punten te beperken.

End-of-pipe emissies

Dit zijn de zogenaamde gekanaliseerde emissie stromen. De te controleren parameters zullen gemonitored worden op de in de wet genoemde condities.

Identificatie emissiepunten

De volgende punten zijn geïdentificeerd:

A Tankopslag (adem en vulverliezen);
B Verladingactiviteiten;
C Transport van vloeistoffen in bovengrondse pijpleidingen.

Het betreft hier vooral emissies naar de lucht. Door de getroffen maatregelen worden de emissies van het opslag en transportsysteem geminimaliseerd.

Kwantificering emissie

Kwantificering van emissie naar de lucht zal plaatsvinden via een éénduidig en uniform rekenmodel dat onderdeel is van het IMKO-2 convenant en gebaseerd is op het handboek emissiefactoren (Diffuse emissies bij op- en overslag, rapportagereeks milieumonitor #14, maart 2004).

De toepassing van de methodiek berekenen wordt ook In het BREF "emissions from storage" (paragraaf 4.1.2.2.3) aangemerkt als meest gebruikelijk binnen de branche. Reden hiervoor is dat meting van emissies van tanks zeer complex en daardoor kostenintensief is.

Data productieketen

De data voor emissie moet betrouwbaar en vergelijkbaar zijn. Het verkrijgen van data wordt gewaarborgd in de milieuvergunning. Het zorgsysteem zal de handelingen beschrijven in elke stap van data management (meting, monstername, monster opslag, transport en behoud, monster voorbehandeling, analyse, data verwerking, rapportage). De vaststelling van de betrouwbaarheid en de vergelijkbaarheid van de data is ook opgenomen.

Toetsing regelgeving

De registratie en verwerking van metingen worden op een dusdanige wijze uitgevoerd dat het bevoegd gezag kan beoordelen of het voldoet aan dat besluit en de regeling.
De meetmethoden zijn opgenomen in normen, daarnaast is in het milieuzorgsysteem vastgelegd wie en hoe de data interpretatie plaatsvindt en gerapporteerd wordt.

Rapportage

De IPPC geeft goede rapportage praktijken aan. Hieraan wordt voldaan.

2.6 BREF "Economics and cross-media effects"

Voor de toetsing BREF "Economics and cross media effects" is de definitieve versie van het betreffende BREF-document van juli 2006 gebruikt (Code ECM).

Deze horizontale BREF is geschreven ter ondersteuning bij de beoordeling van BBT. Bij de bepaling van BBT moet men naast de kosten & baten ook rekening houden met het voordeel voor het milieu en de verschillende effecten op de verschillende milieucompartimenten.

Hoewel de methodologie die is beschreven waar mogelijk redelijk vereenvoudigd is, is het uitvoeren van het onderzoek nog een lastig proces en moet niet in overweging worden genomen tenzij er een echte onenigheid is of een voorgestelde techniek wel of niet BBT is (pagina iii van het BREF).

De voorgenomen activiteit betreft een terminal voor op- en overslag van vloeistoffen en deze is getoetst aan het BREF voor deze bedrijfstak. Geconcludeerd wordt dat de installatie op alle belangrijke punten aan BBT voldoet of er wordt gemotiveerd afgeweken van BBT. Er is dus geen grond om een vergelijking van technieken uit te voeren.

3 CONCLUSIE

Op grond van de resultaten van de voorgaande hoofdstukken wordt de algemene conclusie getrokken dat de voorgenomen activiteit van VTW zijn gebaseerd op BBT en voldoet aan de beoordeelde BREF's.

BIJLAGE 1
BREF "Emissions from storage"

Hfst. 5.1 Storage of liquids and liquefied gases
Par. 5.1.1 Tanks

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1.1.1 General principles to prevent reduce emissions	Tank design	BAT for a proper design is to take into account at least the following: • the physico-chemical properties of the substance being stored • how the storage is operated, what level of instrumentation is needed, how many operators are required, and what their workload will be • how the operators are informed of deviations from normal process conditions (alarms) • how the storage is protected against deviations from normal process conditions (safety instructions, interlock systems, pressure relief devices, leak detection and containment, etc.) • what equipment has to be installed, largely taking account of past experiences of the product (construction materials, valve quality, etc.) • which maintenance and inspection plan needs to be implemented and how to ease the maintenance and inspection work (access, layout, etc.) • how to deal with emergency situations (distances to other tanks, facilities and to the boundary, fire protection, access for emergency services such as the fire brigade, etc.).	ja	In lijn met de Vopak Project Management Guidelines zijn de vermelde BBTs doorlopen. Informatie is beschikbaar in diverse projectdocumentatie, risico analyses, notulen enz.
5.1.1.1 General principles to prevent reduce emissions	Inspectie en onderhoud	BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as the risk and reliability based maintenance approach	ja	Onderdeel van de realisatiefase van het project.
5.1.1.1 General principles to prevent reduce emissions	Location and layout	For building new tanks it is important to select the location and the layout with care, e.g. water protection areas and water catchment areas should be avoided whenever possible. BAT is to locate a tank operating at, or close to, atmospheric pressure aboveground.	ja	Tanks zijn bovengronds en atmosferisch.
5.1.1.1 General principles to prevent reduce emissions	Tank colour	BAT is to apply either a tank colour with a reflectivity of thermal or light radiation of at least 70 %, or a solar shield on aboveground tanks which contain volatile substances	ja	Tanks zijn (nagenoeg) wit, eventueel met logo, maar altijd met een reflectie van meer dan 70%, hetgeen opwarming /

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
				gasvorming reduceert. Bovendien zijn de tanks uitgerust met een direct contact aluminium drijvend dak hetgeen gasvorming reduceert.
5.1.1.1 General principles to prevent reduce emissions	Emissions minimisation principle in tank storage	BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect	ja	De dampverwerkingsinstallatie is geschikt om alle schepen te behandelen, hetgeen niet wettelijk vereist is. De tanks zijn niet op de DVI aangesloten, omdat uit studie gebleken is dat dit niet energie-efficient is.
5.1.1.1 General principles to prevent reduce emissions	Monitoring of VOC	On sites where significant VOC emissions are to be expected, BAT includes calculating the VOC emissions regularly. The calculation model may occasionally need to be validated by applying a measurement method.	ja	Gebruik van Caruso (emissieberekeningsmodel) zoals andere VOTOB terminals
5.1.1.1 General principles to prevent reduce emissions	Dedicated systems	BAT is to apply dedicated systems. Dedicated systems are generally not applicable on sites where tanks are used for short to medium-term storage of different products	nee	Omdat de tanks bij Vopak gebruikt worden voor korte termijn opslag van verschillende vloeistoffen is het toepassen van dedicated systemen geen optie. De leidingen zijn 'piggable' (leegdrukken met stikstof) en verschillende produktstromen zijn fysiek scheidbaar door de keuze van aansluiten op het

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
				koppelplateau.
5.1.1.2 Tank specific considerations	External floating roof tank	The BAT associated emission reduction level for a large tank is at least 97 % (compared to a fixed roof tank without measures), which can be achieved when over at least 95 % of the circumference the gap between the roof and the wall is less than 3.2 mm and the seals are liquid mounted, mechanical shoe seals. By installing liquid mounted primary seals and rim mounted secondary seals, a reduction in air emissions of up to 99.5 % (compared to a fixed roof tank without measures) can be achieved. However, the choice of seal is related to reliability, e.g. shoe seals are preferred for longevity and, therefore, for high turnovers.	ja	Dubbele mechanische shoe seals.
		BAT is to apply direct contact floating roofs (double-deck), however, existing non-contact floating roofs (pontoon) are also BAT. Additional measures to reduce emissions are • applying a float in the slotted guide pole • applying a sleeve over the slotted guide pole • applying 'socks' over the roof l	ja	BBT (direct contact drijvend dak)
		A dome can be BAT for adverse weather conditions, such as high winds, rain or snowfall.	ja	BBT (koepeldak om weersinvloeden te beperkten)
5.1.1.3 Preventing incidents and (major) accidents	Safety and risk management	BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1.	ja	Systeem zal geïmplementeerd worden tijdens de bouw van de terminal, ook in lijn met de Vopak Fundamentals on Safety
5.1.1.3 Preventing incidents and (major) accidents	Operational procedures and training	BAT is to implement and follow adequate organisational measures and to enable training and instruction of employees for safe and responsible operation of the installation as described in Section 4.1.6.1.1.	ja	Systeem zal geïmplementeerd worden tijdens de bouw van de terminal, ook in lijn met de Vopak Fundamentals on Safety

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1.1.3 Preventing incidents and (major) accidents	Leakage due to corrosion and/or erosion	BAT is to prevent corrosion by: • selecting construction material that is resistant to the product stored • applying proper construction methods • preventing rainwater or groundwater entering the tank and if necessary, removing water that has accumulated in the tank • applying rainwater management to bund drainage • applying preventive maintenance, and • where applicable, adding corrosion inhibitors, or applying cathodic protection on the inside of the tank.	ja	Voldoet aan alle punten
5.1.1.3 Preventing incidents and (major) accidents	Operational procedures and instrumentation to prevent overfill	BAT is to implement and maintain operational procedures – e.g. by means of a management system – as described in Section 4.1.6.1.5, to ensure that: • high level or high pressure instrumentation with alarm settings and/or auto closing of valves is installed • proper operating instructions are applied to prevent overfill during a tank filling operation, and • sufficient ullage is available to receive a batch filling.	ja	Voldoet technisch aan de hoogste stand van de techniek, procedureel zullen de genoemde punten ook geadresseerd worden.
5.1.1.3 Preventing incidents and (major) accidents	Instrumentation and automation to detect leakage	BAT is to apply leak detection on storage tanks containing liquids that can potentially cause soil pollution.	ja	Onder alle tanks
5.1.1.3 Preventing incidents and (major) accidents	Risk-based approach to emissions to soil below tanks	BAT is to achieve a 'negligible risk level' of soil pollution from bottom and bottom-wall connections of aboveground storage tanks.	ja	Tankput vloeistofdicht met HDPE folie. Constructie terp zo dat corrosierisico's geminimaliseerd worden.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1.1.3 Preventing incidents and (major) accidents	Soil protection around tanks – containment	BAT for aboveground tanks containing flammable liquids or liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses is to provide secondary containment, such as: • tank bunds around single wall tanks; see Section 4.1.6.1.11 • double wall tanks; see Section 4.1.6.1.13 • cup-tanks; see Section 4.1.6.1.14 • double wall tanks with monitored bottom discharge; see Section 4.1.6.1.15. For building new single walled tanks containing liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses, BAT is to apply a full, impervious, barrier in the bund, see Section 4.1.6.1.10. Impervious barriers include: • a flexible membrane, such as HDPE • a clay mat • an asphalt surface • a concrete surface.	ja	Vloeistofdichte tankput met HDPE folie, tanks omgeven door putdijk.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1.1.3 Preventing incidents and (major) accidents	Flammable areas and ignition sources	Measures to prevent explosive gas mixtures are: • prevent a vapour-air mixture above the stored liquid, e.g. by applying a floating roof • lower the amount of oxygen above the stored liquid by replacing it with an inert gas (blanketing) • store the liquid at a safe temperature to prevent the gas-air mixture from reaching the explosion limit. The next step is to record the locations of the zones on a plan. This may then be used to prevent the introduction of sources of ignition into hazardous areas. Common ignition sources include: • unprotected electrical equipment • naked flames including welding and cutting equipment • smoking materials • vehicles (or vapour processing units) with internal combustion engines • hot surfaces • frictional heating or sparking • static electricity. In general, static electricity can be prevented or decreased by measures such as: • a low velocity of the liquid in the tank • adding antistatic additives to increase the electrical conduction properties of the liquid.	ja	Direct contact drijvend dak toegepast. Zoneringsplan beschikbaar. Procedures en het Terminal Control System (besturingssysteem van de terminal) houden rekening met limieten met betrekking tot de opbouw van statische elektriciteit (max. 1 m/s tot dak drijft, daarna max. 7 m/s).
5.1.1.3 Preventing incidents and (major) accidents	Fire protection	The necessity for implementing fire protection measures has to be decided on a case-by-case basis. Fire protection measures can be provided by applying, e.g. (see Section 4.1.6.2.2): • fire resistant claddings or coatings • firewalls (only for smaller tanks), and/or • water cooling systems.	ja	Brandbestrijdingssysteem volgens PGS 29 en NFPA regelgeving.
5.1.1.3 Preventing incidents and (major) accidents	Fire-fighting equipment	The necessity for implementing fire-fighting equipment and the decision on which equipment to apply has to be taken on a case-by-case basis in agreement with the local fire brigade.	ja	Brandbestrijdingssysteem volgens PGS 29 en NFPA regelgeving. Eerste concept reeds met brandweer besproken.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1.1.3 Preventing incidents and (major) accidents	Containment of contaminated extinguishant	The capacity for containing contaminated extinguishant depends on the local circumstances, such as which substances are stored and whether the storage is close to watercourses and/or situated in a water catchment area. The applied containment therefore has to be decided on a case-by-case basis, see Section 4.1.6.2.4.	ja	Verbinding met afsluiters tussen putten om overtollig bluswater over te laten vloeien.

Hfst. 5.2 Transfer and handling of liquids and liquefied gases
Par. 5.2.1 General principles to prevent and reduce emissions

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.2.1 General principles to prevent and reduce emissions	Inspectie en onderhoud	BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as the risk and reliability based maintenance approach	ja	Zal tijdens de realisatiefase geïmplementeerd worden.
5.2.1 General principles to prevent and reduce emissions	Leak detection and repair programme	For large storage facilities, according to the properties of the products stored, BAT is to apply a leak detection and repair programme. Focus needs to be on those situations most likely to cause emissions (such as gas/light liquid, under high pressure and/or temperature duties)	ja	Zal in de procedures verwerkt worden.
5.2.1 General principles to prevent and reduce emissions	Emissions minimisation principle in tank storage	BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect. This is applicable to large storage facilities, allowing a certain time frame for implementation.	Ja	Emissiereductie wordt bij ontwerp en realisatie van de terminal meegenomen. De dampverwerkingsinstallatie is geschikt om alle (zee)schepen te behandelen.
5.2.1 General principles to prevent and reduce emissions	Safety and risk management	BAT in preventing incidents and accidents is to apply a safety management system	ja	Systeem zal geïmplementeerd worden tijdens de bouw van de terminal, ook in lijn met de Vopak Fundamentals on Safety

Hfst. 5.2 Transfer and handling of liquids and liquefied gases
Par. 5.2.2. Considerations on transfer and handling techniques

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Opmerkingen
5.2.2.1	Piping	BAT is to apply aboveground closed piping in new situations. Bolted flanges and gasket-sealed joints are an important source of fugitive emissions. BAT is to minimise the number of flanges by replacing them with welded connections, within the limitation of operational requirements for equipment maintenance or transfer system flexibility. BAT for bolted flange connections include: • fitting blind flanges to infrequently used fittings to prevent accidental opening • using end caps or plugs on open-ended lines and not valves • ensuring gaskets are selected appropriate to the process application • ensuring the gasket is installed correctly • ensuring the flange joint is assembled and loaded correctly • where toxic, carcinogenic or other hazardous substances are transferred, fitting high integrity gaskets, such as spiral wound, kammprofile or ring joints.	ja	Is in het ontwerp opgenomen en zal verder in procedures geadresseerd worden.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Opmerkingen
5.2.2.1	Corrosion	Internal corrosion may be caused by the corrosive nature of the product being transferred BAT is to prevent corrosion by: • selecting construction material that is resistant to the product • applying proper construction methods • applying preventive maintenance, and • where applicable, applying an internal coating or adding corrosion inhibitors. To prevent the piping from external corrosion, BAT is to apply a one, two, or three layer coating system depending on the site-specific conditions (e.g. close to sea). Coating is normally not applied to plastic or stainless steel pipelines	ja	Inwendige coating van tankbodems en 1 meter van de wand. Roest inhibitors zullen indien nodig toegepast worden.
5.2.2.2	Vapour treatment	BAT is to apply vapour balancing or treatment on significant emissions from the loading and unloading of volatile substances to (or from) trucks, barges and ships. The significance of the emission depends on the substance and the volume that is emitted, and has to be decided on a case-by-case basis. For example, according to Dutch regulations, the emission of methanol is significant when over 500 kg/yr is emitted.	Ja	BBT

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Opmerkingen
5.2.2.3	Valves	BAT for valves include: • correct selection of the packing material and construction for the process application • with monitoring, focus on those valves most at risk (such as rising stem control valves in continual operation) • applying rotating control valves or variable speed pumps instead of rising stem control valves • where toxic, carcinogenic or other hazardous substances are involved, fit diaphragm, bellows, or double walled valves • route relief valves back into the transfer or storage system or to a vapour treatment system.	ja	BBT BBT (frequentie gestuurde pompen om de capaciteit te regelen)
5.2.2.4 Pumps and compressors	Installation and maintenance of pumps and compressors	The design, installation and operation of the pump or compressor heavily influence the life potential and reliability of the sealing system. The following are some of the main factors which constitute BAT: • proper fixing of the pump or compressor unit to its base-plate or frame • having connecting pipe forces within producers' recommendations • proper design of suction pipework to minimise hydraulic imbalance • alignment of shaft and casing within producers' recommendations • alignment of driver/pump or compressor coupling within producers' recommendations when fitted • correct level of balance of rotating parts • effective priming of pumps and compressors prior to start-up • operation of the pump and compressor within producers' recommended performance range (The optimum performance is achieved at its best efficiency point.) • the level of net positive suction head available should always be in excess of the pump or compressor • regular monitoring and maintenance of both rotating equipment and seal systems, combined with a repair or replacement programme.	ja	Is in het ontwerp opgenomen en zal verder in procedures geadresseerd worden.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Opmerkingen
5.2.2.4 Pumps and compressors	Sealing system in pumps	BAT is to use the correct selection of pump and seal types for the process application, preferably pumps that are technologically designed to be tight such as canned motor pumps, magnetically coupled pumps, pumps with multiple mechanical seals and a quench or buffer system, pumps with multiple mechanical seals and seals dry to the atmosphere, diaphragm pumps or bellow pumps.	ja	BBT
5.2.2.4 Pumps and compressors	Sealing systems in compressors	BAT for compressors transferring non-toxic gases is to apply gas lubricated mechanical seals. BAT for compressors, transferring toxic gases is to apply double seals with a liquid or gas barrier and to purge the process side of the containment seal with an inert buffer gas. In very high pressure services, BAT is to apply a triple tandem seal system.	nvt	nvt
5.2.2.5	Sampling connections	BAT, for sample points for volatile products, is to apply a ram type sampling valve or a needle valve and a block valve. Where sampling lines require purging, BAT is to apply closed-loop sampling lines.	ja	BBT

Vopak

ROYAL HASKONING

BIJLAGE 2
BREF "Common waste water and waste gas treatment/management systems in the chemical sector"

Hfst. 4.2 General BAT

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
4.2 General BAT	BAT for General Environmental Management	BAT is to: • implement and adhere to an environmental management system (EMS) or HSE-system, the whole content of which is detailed in Section 2.1 (such as ISO 9001 / 14001, EMAS, Responsible Care®, ICC Business Charter for Sustainable Development, CEFIC Guidelines for Protection of the Environment). Elements of a good EMS could include: - implementation of a transparent hierarchy of personnel responsibility for EMS concerns including effluent discharge, the persons in charge eporting directly to the top management level - preparation and publication of an annual environmental performance report (e.g. as part of EMAS or ISO 9001 / 14001) to enable the dissemination of performance improvements to the public, which can also serve as a vehicle for information exchange according to Art. 16(2) of the Directive - setting internal (site- or company-specific) environmental targets, reviewing them regularly as detailed in Section 2.2.2.2 and publishing them in the annual report - holding a regular audit to secure compliance with the principles of EMS - regular monitoring of performance and progress towards the achievement of EMS policy - practising risk assessment on a regular basis to identify hazards, as detailed in Section 2.2.3.1 practising benchmarking on a regular basis and challenging the processes (production and waste water / waste gas treatment) on their water and energy consumption, waste generation and cross-media effects as described in Section 2.2.3.2 - implementation of an adequate training programme for staff and instructions for contractors working on the site on HSE and emergency issues, as mentioned in Section 2.2.4.2 - application of good maintenance practices to ensure proper operation of the technical devices.	Ja	ISO 9001 zal gecertificeerd worden, en in principe moet het kwaliteitsysteem voldoen aan de eisen van ISO 14001, zonder tot daadwerkelijke certificatie over te gaan. Vopak volgt naast de ISO eisen diverse audit programma's, waaronder de 'Terminal Health Assessment', die volgens het CDI-T systeem is opgezet, en wereldwijd gevolgd wordt.
4.2 General BAT	BAT for Waste Water / Waste Gas Management	BAT is to: • implement a waste water / waste gas management system or waste water / waste gas release assessment for the entire chemical site with reference to Section 2.1 and Figure 2.2 by using an appropriate combination of: - using a site inventory and a stream inventory or register. These inventories provide the necessary information for the following assessment steps, as described in Section 2.2.1.1 and 2.2.1.2. - pursuing systematically the internal mass streams by applying EMFA (see Section 2.2.1.3) – adequately to the complexity of the waste water / waste gas system – to draw the necessary conclusions for optimisation; for sites with only one or very few emission arising points the application of EMFA can be obsolete or very simple - checking and identifying the most relevant emission sources for each medium and listing them according to their pollutant load. The resultant ranking of emission sources is the basis for an improvement programme which gives priority to those sources that offer the greatest potential	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		reduction efficiency - checking the receiving media (air and water) and their tolerance of the emissions, using the results to determine the extent to which stronger treatment requirements are needed or if the emissions can be accepted at all - performing assessment of toxicity and, subject to available methods, persistence and potential bioaccumulation of waste water to be discharged into a receiving water body, as described in Section 2.2.1.2.1, to identify potentially hazardous effects on the ecosystem and share the results with the competent authorities - checking and identifying relevant water-consuming processes and listing them according to their water usage. The resultant ranking is the basis for improvement of water consumption - pursuing options for improvement (such as options for waste prevention or reduction, improvement of effluent collection and control and/or options for process-integrated measures), focusing on streams with higher concentrations and loads, their hazard potential and impact on the receiving water body, as detailed in Section 2.1 in connection with Figure 2.2 ***Split view*** *One Member State expressed the opinion that the statements on BAT for waste water and waste gas management are partly too general and they refer to examples for streams with higher concentrations and loads (as mentioned in Section 2.2.2.3.1).* - assessing the most effective options by comparing overall removal efficiencies, overall balance of cross-media effects, technical, organisational and economic feasibility etc., as detailed in Section 2.1 The waste water / waste gas release assessment is the basis for all decisions on stream segregation, reduction strategies, process improvements (see the vertical BREFs on the chemical and related sectors with respect to cleaner process technology, clean raw material, improved process equipment, control of leakages etc.) and control techniques. An example of an efficient waste water management - as reported from Germany - which follows the outlined strategy for chemical sites carrying organic loads from the production of organic chemicals has as a reasonable target an overall COD-removal performance (including pretreatment) of at least 90 %. BAT for the measures to be adopted in the light of the results of waste water / waste gas release assessment are dealt with in Section 4.3. • assess impact on the environment and the effects on treatment facilities when planning new activities or alterations to existing activities, comparing the future environmental situation with the existing one and indicating whether substantial changes are to be expected • practice emission reduction at source by stream segregation, installation of adequate collection systems and construction measures (see Section 4.3) • link production data with the data on emission loads to compare the actual and calculated releases.		

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		If the data obtained do not match, the processes responsible for unexpected releases need to be identified • treat contaminated waste water / waste gas streams at source in preference to dispersion and subsequent central treatment, unless there are good reasons against it. Most treatment techniques work most efficiently when the pollutant content is high. It is also economical to treat relatively small tributary streams with small, high-efficiency treatment devices than to have large central facilities with high hydraulic load • use quality control methods, as described in Section 2.2.2.6, to assess the treatment and/or production processes and/or prevent them running out of control • apply good manufacturing practice (GMP) for equipment cleaning to reduce emissions to water and to air • implement facilities / procedures to enable timely detection of a deviation that could affect the downstream treatment facilities, so as to avoid an upset of those treatment facilities, enable identification of the source of deviation and eliminate its cause; in the meantime the arising waste water can be diverted into retention facilities and the waste gas to adequate safety facilities, e.g. a flare • install an efficient central warning system that will give notice of failures and malfunctions to all concerned; when the accident could have a significant effect on the environment and/or the neighbourhood, the competent authorities need to be part in the information chain • implement a monitoring programme in all treatment facilities to check that they are operating properly, to enable detection of any irregularities or operating failures that might influence the receiving media and give information on the actual emissions of pollutants the implementation of a monitoring programme to detect the emissions is required by Art. 9(5) of the Directive, with the information obtained serving as information to the public under Art. 15(2) of the Directive. The monitoring programme needs to include the contaminants and/or surrogate parameters relevant to the treatment facility. The frequency of the measurements depends on the hazard risk of the pollutants in question, the failure risk of the treatment facility and the variability of the emissions • put in place strategies for dealing with fire-fighting water and spillages, as described in Section 2.2.4.1 • put in place a pollution incident response plan to enable the most rapid and appropriate response to internal accidents and operating failures, as described in Section 2.2.4.2 • allocate costs of treatment associated with production.		

Vopak

ROYAL HASKONING

Hfst 4.3.1 Specific BAT – waste water

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
4.3.1 Specific BAT – waste water	BAT for Process-integrated Measures	BAT is an appropriate combination of: • using process-integrated or waste water or contaminant-recovering measures in preference to end-of-pipe techniques when there is a choice • assessing existing production installations for options of retrofitting process-integrated measures and implement them when feasible or at latest when the installation undergoes major alterations • using process water in a recycle mode whenever feasible for economic and quality reasons, with a maximum number of recycles before discharge, as described in Section 3.3.1.2 • optimising product washing processes by avoiding once-through processes whenever feasible for quality reasons, as mentioned in Section 3.3.1.1 • avoiding direct contact cooling systems whenever feasible, as detailed in Section 3.3.1.3 • using closed-circuit vacuum generation instead of water jet or vapour jet pumps whenever feasible, e.g. when their use is not prohibited by safety or corrosion issues as mentioned in Section 3.3.1.4 • assessing whether water-based waste gas treatment processes can be replaced by other measures, as described in Section 3.3.1.5. Waste gas treatment techniques using relatively high amounts of water (such as scrubbing or cooling medium) are of special significance in regions where water is in short supply. Examples of such measures, which can be of high importance in regions with water shortage, are: - removal of solid matter by dry techniques rather than by wet scrubbing - reduction of SOx in flue gas by secondary measures rather than by systems that include wet scrubbing.	Ja	Slopsysteem naar sloptanks, minimalisatie van slops.
4.3.1 Specific BAT – waste water	BAT for Waste Water Collection	BAT is to: • segregate process water from uncontaminated rainwater and other uncontaminated water releases. This minimises the amount of water requiring treatment and the hydraulic load sent to treatment facilities. It enhances the cost and performance efficiency of treatment devices. If existing sites do not yet operate water segregation, it can be installed – at least partially – when major alterations are made to the site • segregate process water according to its contamination load: organic, inorganic without or with insignificant organic load or insignificant contamination. It ensures that a treatment facility receives only those pollutants it can cope with • install a roof over areas of potential contamination by, for example, spillage or leakage - wherever feasible. It prevents rainwater falling on these areas and mixing with contaminants that would otherwise increase the amount of waste water requiring treatment	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		• install separate drainage for areas of contamination risk, containing a sump to catch leakage or spillage losses, as described in Section 3.3.4.4. They prevent the discharge of rainwater contaminated by product losses. The separately captured rainwater is released after adequate monitoring and discharged, according to the results, either directly to the drainage system for uncontaminated rainwater or to appropriate treatment facilities • use overground sewers for process water inside the industrial site between the points of waste water generation and the final treatment device(s). If climatic conditions do not allow overground sewers (temperatures significantly below 0 °C), systems in accessible underground ducts are a suitable replacement. Both provide easy and economical leak detection, maintenance work and options for retrofitting new equipment into existing installations. Many chemical industry sites are still provided with underground sewers and the immediate construction of new sewer systems is normally not viable, but work can be done in stages when major alterations at production plants or the sewer system are planned • install retention capacity for failure events and fire-fighting water in the light of a risk assessment, choosing one, two or all of the following options: - decentralised retention for detected failure events, whenever possible close to the production plants and large enough to prevent the release of substances into the sewer during the process undergoes a controlled shut down - central retention to collect waste water from failure events that has already entered the sewerage system instead of ducting it to the central WWTP, as described in Section 3.3.3. Although there are several kinds of retention systems in operation that can be considered to be BAT, the most secure systems are those where the tank is flooded only in the case of a failure event (see Figure 3.2) or where two tanks are filled alternately (see Figure 3.1) - retention for fire-fighting water, either used in isolation or in combination with local containment. Experience has shown that fire-fighting water can amount to thousands of cubic metres (for example about 15000 m3 highly contaminated fire-fighting water) and the retention capacity needs to be large enough to cope with it to protect both surface and waste water drainage systems - drainage system for hazardous and inflammable substances, e.g. to transport them from the fire zone.		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	General BAT is to: - allocate contaminated waste water streams according to their pollutant load. Inorganic waste water without relevant organic components is segregated from organic waste water and ducted to special treatment facilities (see special sections on heavy metals and inorganic salts, discussed later in this chapter). Organic waste water with a relevant portion of inorganic and refractory or toxic organic	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		compounds is directed to special pretreatment devices (see sections on heavy metals, inorganic salts and pollutants unsuitable for biological treatment later in this chapter).		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Rainwater BAT is to: - duct uncontaminated rainwater directly to a receiving water, by-passing the waste water sewerage system - treat rainwater from contaminated areas by using techniques described in Sections 3.3.4.1.1, 3.3.4.4.1 and 3.3.4.4.2, see Table 4.1, before discharging it into a receiving water. In some cases the use of rainwater as process water to reduce fresh water consumption may be environmentally beneficial.	ja	
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Free Oil / Hydrocarbons BAT is to: - remove oil / hydrocarbons when they appear as large slugs and where these are incompatible with other systems, with the aim of maximising recovery, by applying an appropriate combination of: _ oil/water separation by cyclone, MF or API, when large slugs of free oil or hydrocarbons can be expected, otherwise PPI and CPI are alternatives, details in Section 3.3.4.1.6 _ MF, granular media filtration or gas flotation, which are described in Section 3.3.4.1.5, 3.3.4.1.4 and 3.3.4.1.3 respectively _ biological treatment (see section on biodegradable substances), either in a central biological WWTP, a municipal WWTP or a separate treatment plant for this special waste water stream.	Ja	Biologische behandeling niet mogelijk vanwege verwachte kleine hoeveelheid verontreinigingen. Putten zijn afgesloten en water wordt slechts na controle afgelaten naar WWT
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Emulsions BAT is to: - break emulsions at source and recover the separated constituents. The addition of flocculating and/or coagulating chemicals can be necessary to support separation; treatment at source enables recovery and prevents adverse effects on downstream sewerage systems; or - remove emulsions at source when they cannot be broken and can have adverse effects on downstream facilities. Suitable treatment techniques are such as air oxidation, evaporation, incineration (when the heat value of the emulsion allows autothermal operation) or biological degradation. Often it is not permitted to discharge emulsions into public sewerage systems.	Ja	
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Total suspended solids (TSS) BAT is to: - remove TSS from waste water streams when they can cause damage or failure to downstream facilities such as abrasion and clogging in pumps and pipes or clogging and plugging in treatment facilities. Downstream treatment facilities, which might be damaged, are items such as filters,	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		adsorption columns, membrane filters, oxidation vessels using UV irradiation or the central and municipal WWTP. The techniques are listed in Table 4.3.The ranking of treatment techniques is: _ 1st step: sedimentation / air flotation to catch the main TSS load and to protect subsequent filter systems from clogging or high frequencies of backwashing. Sedimentation or air flotation is normally sufficient to prevent abrasion and clogging in pumps and pipes (provided emulsions and inseparable solids have been treated successfully) _ 2nd step: mechanical filtration as an option, if the solid content has not been reduced enough to prevent clogging in subsequent treatment facilities, such as membrane filtration, adsorption, chemical oxidation reaction using UV irradiation _ 3rd step: MF or UF as an option, if the waste water stream needs to be solid-free to prevent clogging, for example, in NF or RO facilities, or free of other particles that cannot be removed by other filtration techniques - remove TSS from waste water streams before discharging into a receiving water. As long as no hazardous substances are included in TSS, the common techniques are: _ sedimentation / air flotation _ filtration, only if required because of insufficient separation by the preceding techniques - remove TSS from waste water streams using a technique that enables recovery in preference to abatement techniques whenever it is feasible and viable to re-use the solids - apply flocculating and/or coagulating agents when finely dispersed or otherwise inseparable material is present to produce flocs large enough to settle - cover or close the treatment device when odour and/or noise are an issue, duct the exhaust air to further waste gas treatment if necessary and implement the necessary safety devices when explosion risk can be expected in the closed treatment device - dispose of the sludge appropriately either by handing it to a licensed contractor or by treating it on site (see section on sludge treatment). The techniques to consider as BAT, depending on the application, are those described in Sections 3.3.4.1.2 - 3.3.4.1.5 and listed in Table 4.3.		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Heavy Metals BAT is to: - segregate waste water containing heavy metal compounds as far as possible and - treat the segregated waste water streams at source before mixing with other streams and - prefer techniques that enable recovery. The techniques that can be applied to achieve these requirements are listed in Table 4.4 and - facilitate further elimination of heavy metals in a final WWTP (chemico-mechanical stage for inorganic productions, biotreatment for organic productions) as a polishing step, with subsequent	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		treatment of sludge, if necessary. The TWG could not provide BAT-associated emission levels for heavy metals in tributary waste water streams that would be applicable to the chemical sector as a whole for the reasons detailed in Section 3.3.4.2.1. The emission levels resulting from the application of BAT mentioned above are dependent on the production process from which the heavy metal pollutants originate.		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Inorganic Salts and/or Acids (Ionic Particles) BAT is to: - control the inorganic salt and acid content of waste water streams with negative impact on the biosphere of receiving water appropriately, if necessary preventing its discharge. When treatment is required, it is more cost-effective if done at source - control the inorganic salt content (mainly chloride and sulphate) by treatment at source when it could cause damage, failure and/or malfunction of the on-site or municipal sewerage system - choose a treatment technique that enables recovery and re-use of the treated contaminants whenever it is feasible and suitable, taking into account cross-media effects and the impact of the pollutants	ja	
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Pollutants Unsuitable for Biological Treatment	NVT	Geen biologische behandeling
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Biodegradable Substances BAT is to: - remove biodegradable substances from waste water using biological treatment systems as described in Section 3.3.4.3 and Table 4.7 or an appropriate combination of them. When anaerobic processes are applied, a subsequent aerobic treatment step is often required - use biological pretreatment when relevant tributary streams carry a high biodegradable organic load to relieve the final central WWTP, if this is a feasible option. Anaerobic treatment can be a choice to use the energy offered by the generation of methane, which can be combusted. Another advantage of anaerobic pretreatment is the considerable overall reduction of excess activated sludge in the downstream biological WWTP. When COD removal efficiency of the overall waste water treatment processes is high, but the concentration to be discharged is considerable higher than the BAT-associated level in Table 4.8, it is an indication that highloaded tributary streams may need biological pretreatment - use pretreatment or polishing facilities, as described in Table 4.7, if compounds with low biodegradability (but not recalcitrant or toxic compounds) are not sufficiently removed by central	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		biological waste water treatment. Suitable techniques are fixed-bed reactors, which enable a longer residence time and hence higher degradation rates - implement nitrogen removal techniques (nitrification / denitrification) as described in Section 3.3.4.3.4 when the waste water contains a relevant nitrogen load, which might cause considerably higher concentrations than the BAT-associated emission level in Table 4.8. Both described techniques are BAT. Under favourable conditions they are easily retrofittable into existing central WWTP. When only tributary streams carry considerable nitrogen loads (ammonium, nitrate, nitrite, Kjeldahl-N) it is preferable to treat those separately, which saves cost because small equipment for nitrification / denitrification is not excessively expensive.		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Central Chemical-mechanical WWTP When there are no biodegradable contaminants, it is BAT to: - use a combination of chemical treatment (for neutralisation and precipitation of waste water components) and mechanical treatment (for the elimination of undissolved substances, including screening, clarification and filtration) as chemical-mechanical stage.	Ja	
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Central Biological WWTP When a central biological WWTP is used, it is BAT to: - avoid the introduction of non-biodegradable waste water pollutants into the central biological treatment plant, when they could cause malfunction of the treatment system and when the plant is not suitable to treat them buffer the incoming waste water streams upstream of the treatment section to equalise the contaminant load and to use synergetic effects - treat the incoming waste water, as described in Section 3.3.4.3.5, by using a combination of: _ primary clarifier with preceding mixing station _ one- or two-stage aeration device (basin or tank) with subsequent clarifier _ filtration or air flotation to protect the receiving water from excess activated sludge floc not easily separable, e.g. bulking sludge _ alternatively to 2nd and 3rd indent: aeration basin or tank with dipped MF- or UFmembrane. _ additional option as final treatment a fixed-bed biofilter to treat refractory COD if necessary because of regulatory requirements.	Ja	
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	Waste Water Discharge into Surface Water BAT is a suitable combination of: - avoiding a discharge situation such as excessive hydraulic load or toxic waste water that can cause damage to the river bed, the embankment or the biosphere of the receiving water - choosing, whenever it is possible, a discharge point into surface water where the waste water is most efficiently dispersed. This minimises the impact on the aqueous biosphere. This measure is not intended to replace treatment techniques	Ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		- balancing waste water not coming from a central WWTP to reduce the impact on the receiving water body and to meet discharge requirements before discharging it - implementing a monitoring system to check the water discharge with adequate monitoring frequency (e.g. between 8 and 24-hours sampling) - performing toxicity assessment as a complementary tool with the aim of obtaining (more) information on the effectiveness of the control measures and/or on the hazard assessment for the receiving water body. The application of toxicity assessment, such as the actual need, the methods to be used and programming should be determined on a case-by-case basis.		
4.3.1 Specific BAT – waste water	BAT for Waste Water Treatment	BAT for Sludge Treatment When sludge from waste water facilities is treated on the chemical industry site, it is BAT to: - operate the techniques described in Section 3.4, also taking into account landfilling - concentrate sludge using the techniques described in Section 3.4.1 - stabilise sludge for further treatment or disposal using the techniques described in Section 3.4.2 - use waste energy from chemical production processes as far as possible when thermal sludge treatment, e.g. drying, as described in Section 3.4.3 is operated - operate appropriate waste gas treatment when sludge incineration is used as described in Section 3.4.3. Off-site treatment is not taken into account because it is not within the scope of the document. This is by no means a BAT conclusion against off-site treatment by third-party contractors.	Ja	

Hfst 4.3.2 Specific BAT – waste gas

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
4.3.2 Specific BAT – waste gas	BAT for Waste Gas Treatment	BAT for Process-integrated Measures BAT is to: • use process-integrated measures in preference to end-of-pipe techniques when there is a choice (e.g. in the case of NOx from combustion processes, the use of primary reduction techniques such as low-NOx burners, in preference to secondary treatment techniques) • assess existing production installations for options of retrofitting process-integrated measures and implement them when feasible or at latest when the installation undergoes major alterations. The observation of safety rules is a crucial point when assessing existing production lines for retrofitting options, because some might not allow the implementation of process-integrated measures due to explosion or corrosion risk • assess existing production installations for options of source reduction of gaseous contaminants and implement these options if feasible (also under safety conditions). Contaminant reduction at source reduces the amount of waste gas to be treated. Large amounts of unnecessary waste gas mean installing larger equipment than necessary, which is not cost-effective • consider as far as possible all options for source reduction when planning a new installation or major alterations	Ja	
4.3.2 Specific BAT – waste gas	BAT for Waste Gas Treatment	BAT for Waste Gas Collection BAT is to: • minimise the gas flow rate to the control unit by encasing the emission sources as far as possible. However, process operability, safety issues, product quality and hygiene concerns take precedence, as mentioned in Section 2.2.2.4.2 • prevent explosion risk by: - installing a flammability detector inside the collection system when the risk of occurrence of a flammable mixture is significant - keeping the gas mixture securely below the LEL by adding air sufficient to limit it to 25 % of LEL, by adding inert gas, such as nitrogen, instead of air or by working under inert atmosphere in the production vessel. The other option is to keep the gas mixture securely above HEL. • install appropriate equipment to prevent the ignition of flammable gas-oxygen mixtures or minimise its effects, such as detonation arrestors and seal drums.	Ja	
4.3.2 Specific	BAT for Waste Gas Treatment	Dust BAT is an adequate combination of: - removing particulate matter and aerosols / droplets from waste gas streams, using techniques or	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
BAT – waste gas		combinations of techniques described in Section 3.5.3 and Table 4.9 according to the given situation using pretreatment to prevent final facilities from damage or overloading. Damage is done by e.g. hard or large particles or particles that clog filters, adsorption columns, scrubber surfaces, membrane surfaces, catalysts - using high-efficiency techniques to remove considerable amounts of submicron particulate matter - implementing downstream mist filter when wet scrubbers are used as final treatment device (with a HEAF the use of a mist filter downstream is already included) - operating techniques In their appropriate pressure range (a/c ratio, flow rate/surface ratio) to prevent damage to the vessel or dust emissions from vessel leaks - using material recovery wherever feasible - taking into account energy consumption by critically assessing the use of energyintensive techniques and comparing the results with energy-free or low-energy techniques - taking into account water consumption, most of all in regions where water shortage is an issue. The use of wet scrubbing needs to be assessed and the results compared with water-free techniques - using scrubbing water in a recycle mode with a maximum number of recycles when it is feasible and does not lead to abrasion or corrosion in the scrubber vessel.		
4.3.2 Specific BAT – waste gas	BAT for Waste Gas Treatment	VOC BAT is an appropriate combination of: - removing VOC from waste gas streams, using techniques (or a combination thereof) described in Sections 3.5.1 and 3.5.2 and listed in Table 4.10. - using recovery techniques such as condensation, membrane separation or adsorption whenever feasible to regain raw material and solvents. Waste gas streams with high VOC concentrations are best pretreated by techniques such as condensation or membrane separation / condensation to recover the main load before sending them to adsorption, wet scrubbing or combustion. In the case of adsorption and combustion this can also be a safety issue, keeping VOC concentration below 25 % LEL - taking into account water consumption (process and cooling water) with techniques such as wet scrubbing, condensation (when water is used as cooling medium), adsorption (when water is used in regeneration processes or to cool the waste gas stream before entering the adsorption column) or biological treatment (where water is used as reaction medium). The use of those techniques needs to be assessed and compared with the results of water-free techniques. When water shortage is an important issue these techniques can become unsuitable under special local conditions - using abatement techniques only when recovery is not feasible, e.g. because of very low VOC concentrations causing expenditure of energy or material disproportionate to the ecological benefit derived - assessing existing waste gas abatement if material recovery is feasible and implement the appropriate technique, if the response is positive	ja	Ook alle schepen zullen op de DVI aangesloten worden indien de zeeschepen een aansluiting hebben.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		- preferring biological treatment of low-concentration waste gas streams to incineration processes if applicable (i.e. when content and composition of the waste gas as well as climate characteristics are suitable, see Section 3.5.2.1) and if water saving allows it. The consumption of supporting fuel for the incineration of low VOC concentrations is a disadvantage that can, however, be counterbalanced if no other treatment is feasible to achieve the environmental targets set, for example, by legal restrictions - using combustion of waste gas streams, especially when autothermal operation is possible, when hazardous compounds need to be abated or when other, likewise efficient techniques are not available - preferring catalytic oxidation whenever feasible and ecologically favourable compared to thermal oxidation. The much lower NOx-content in the emitted flue gas, the lower operation temperature and energy requirement may render it more advantageous than thermal oxidation - operating combustion techniques with energy recovery (gas engine, regenerative and recuperative incinerator) when feasible using thermal incineration when catalytic incineration is not applicable, e.g. because of poisonous effects of the waste gas content, or the lower destruction efficiency of catalytic oxidation is not sufficient to abate the respective VOC appropriately - implementing combustion exhaust gas treatment after incineration when considerable amounts of exhaust gas contaminants are to be expected because of the waste gas contaminants exposed to incineration, such as SO2, HCl, NOx, whereas dioxins are normally not an issue in waste gas combustion - using flaring only to dispose safely of surplus combustible gases from, e.g. maintenance events, upset systems or remote vents without connection to abatement systems - using ground flares only when there are no hazardous substances expected in the flue gas. When flares are needed, despite the foregoing conclusion, the options for heat recovery and low-NOx burning have to be assessed and, when the result is positive, the respective equipment has to be implemented.		
4.3.2 Specific BAT – waste gas	BAT for Waste Gas Treatment	Other compounds than VOCs BAT is to - remove these waste gas pollutants (hydrogen halides, Cl2, SO2, H2S, CS2, COS, NH3, HCN, NOx, CO, Hg) by applying the appropriate techniques listed in Table 4.10. Appropriate techniques are: _ wet scrubbing (water, acidic or alkaline solution) for hydrogen halides, Cl2, SO2, H2S, NH3 _ scrubbing with non-aqueous solvent for CS2, COS _ adsorption for CS2, COS, Hg _ biological gas treatment for NH3, H2S, CS2 _ incineration for H2S, CS2, COS, HCN, CO _ SNCR or SCR for NOx. - recover hydrogen chloride whenever feasible by using water as scrubbing medium in the first scrubbing stage to produce a solution of hydrochloric acid to be used as raw material	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		- recover NH3 whenever feasible, using a technique that enables its recovery.		
4.3.2 Specific BAT – waste gas	BAT for Waste Gas Treatment	BAT for Combustion Exhaust Gas Treatment BAT for dust removal is to • implement ESP or bag filter (after heat exchanger at 120-150 °C) or • implement catalytic filtration or • implement wet scrubbing BAT for removal of HCl, HF and SO2 is to • recover them when feasible by using two-stage wet scrubbing, using in the first stage water or acidic solution as scrubber medium in recycle mode to remove HF and HCl, using in the second stage calcium carbonate suspension to remove SO2 as calcium sulphate (after air injection). Both HCl and calcium sulphate can be recovered as enriched raw hydrochloric acid and gypsum respectively. Two-stage wet scrubbing is also used without material recovery to separate chloride and fluoride ions before desulphurisation or • remove them by dry or semi-dry or wet sorbent injection as described in Section 3.5.4.1, the generated dust being removed together with the incineration dust. Wet scrubbing, however, is normally the most efficient technique for abatement as well as for recovery. There are more FGD techniques, mainly used in power plants, which are within the scope of the BREF on large combustion plants. BAT for removal of NOx is to • implement SCR instead of SCNR (at least for larger installations) because it has better removal efficiency and environmental performance (see Section 3.5.4.2). For existing installations which operate SNCR devices, the time to consider exchange might be when major alterations are planned for the incineration plant. Although SCR is BAT in the general sense, there are individual cases (typically smaller installations) where SNCR is the technically and economically best solution. Assessment needs to be made if other measures achieve better overall improvement instead of retrofitting SNCR. There are more DeNOx processes in use, e.g. several simultaneous removal techniques of SO2 and NOx, which are also BAT when they achieve similar performance. When dioxins can be expected it is BAT to • abate dioxins by using a GAC filter (adsorption) at the end of flue gas treatment. Techniques that achieve comparable results (see Table 4.11) are also considered as BAT.	NVT	

BIJLAGE 3
BREF "Mineral oil and gas refineries"

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.2	BAT for process/activity	Apply the BAT determined in the BREF on storage	ja	Zie bijlage 1
		Ensure the liquids and gases stored are in appropriate tanks or vessels based on the true vapour pressure of the stored material (see storage BREF)	ja	Zie bijlage 1
		Implement containment BAT (see storage BREF)	ja	Zie bijlage 1
		Use high-efficiency seals in floating roof tanks (see storage BREF)	ja	Zie bijlage 1
		Bund all stored chemicals, with separate bunding for incompatibles (see storage BREF)	ja	Zie bijlage 1
		Apply emission reduction measures during tank cleaning (see 4.21.10-11): • tanks have to be emptied, cleaned and rendered gas-free	nee	Dampen vrijkomend uit tanks worden niet afgevangen. IDD zorgt voor zo min mogelijk verdamping.
		Apply concepts of good housekeeping and environmental management (see section 5.1 and 4.15.3): • implement and adhere to an Environmental Management System (EMS): o preparation and publication of an annual environmental performance report o delivery to stakeholders on an annual basis of an environmental performance improvement plan o practice of benchmarking on a continuous basis • improve stability of unit operation by applying advanced process control and limiting plant upsets • apply good practices for maintenance and cleaning • implement environmental awareness and include it in training programmes • implement a monitoring system that allows adequate processing and emission control • planning and carrying-out of maintenance by:	Ja / nee	Een milieuzorgsysteem zal worden opgesteld conform de richtlijnen van ISO 14001

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		○ preventive maintenance programmes ○ prompt clean-up of minor spillages with adsorbents • regular cleaning of equipment and terminal premises		
		Minimize number of tanks and volume by a suitable combination of: application of in-line blending, integration of processing units, co-operation with partners in industry. This technique is much easier to apply on new facilities (see 4.21.7, 4.21.14, 4.15.5): • reduce the need for certain tanks through improved planning and more continuous operations	ja	VTW is 24 uur per dag operationeel.
		Enhance vapour balancing and back venting during loading/unloading processes, e.g. by vapour balance lines that transfer the displpced vapour from the container filled to the one being emptied. Incompatibility of tank vapours and applicability to extend floating roofs tanks are some examples of restrictions of application. Applicability needs to reflect economics, the type and size of vessel to be used (e.g. tank, truck, railcar, ship), type of hydrocarbon fraction and frequency of use of the tank. Because this technique is related to the next on, both should be evaluated together when implementing on a specific site (see 4.21.18):	Nee	Een dampbalanceersysteem maakt geen onderdeel uit van het ontwerp vanwege de grotere risico's dit dit met zich meebrengt. Dampen worden afgevangen door een dampverwerkingsinstallatie (DVI)
		Apply vapour recovery (not applicable to non-volatile products) on tanks, vehicles, ships etc. in stationary use and during loading/unloading. Achieved emissions levels are very dependent on the application, but recoveries of 95->99% are considered BAT. If VRU's are not considered appropriate for certain streams, vapour destruction units are considered BAT. Properties of streams, such as type of substance, compatibility of substances or quantity need to be considered in the applicability of this BAT. Applicability needs to reflect economics, the type and size of vessel to be used (e.g. tank, truck, railcar, ship), type of hydrocarbon fraction and frequency of use of the tank. Because this technique is related to the above one, both should be evaluated together when implementing on a specific site (see 4.21.16 and 4.23.6.2)	ja	De DVI zal alle dampen afvangen en verwerken die vrijkomen bij het laden van schepen.

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		Reduce (risk of) soil contamination by the implementation of an inspection and maintenance programme that could include implementing good housekeeping measures, bouble-bottom tanks, impervious liners, good housekeeping practices (draining, sampling, tanks bottoms) (as part of EMS) (see 4.21.8 and 4.21.13)	ja	Het ontwerp van VTW gaat uit van impervious liners onder alle tanks. VTW zal voor het bepalen van de inspectie termijnen Risk Based Inspection toepassen. De degradatie van de bodem, wand en dak, wordt d.m.v scans gecontroleerd en de resterende levensduur van de tank bepaald. VTW voldoet aan de standaarden zoals door Vopak Maintenance Management worden voorgeschreven
		Install self-sealing hose connections or implement line draining procedures (see 4.21.13)	ja	Alle leidingen zijn volledig leeg te pompen. Dit gebeurd over de hele terminal d.m.v. stripper pompen, behalve de leiding tussen het koppelplateau en de steiger, welke pigbaar zijn. (bij het laden en lossen van schepen worden geen slangen gebruikt, alleen leidingen)

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
		Install barriers and/or interlock systems to prevent damage to equipment from the accidental movement or driving away of vehicles (road or rail tank cars) during loading operations (see 4.21.13)	ja	Interlocks installed
		Implement procedures to ensure that arms are not operated until inserted fully into the container to avoid splashing where top loadin arms are used (see 4.21.13)	NVT	
		Apply instrumentations or procedures to prevent overfilling (see 4.21.13)	ja	VTW past een onafhankelijke overvulbeveiliging op de tanks toe. De afsluiter wordt hardwarematig dicht gestuurd, onafhankelijk van menselijk ingrijpen.
		Install level alarms independent of normal tank gauging system (see 4.21.13)	ja	

Vopak

ROYAL HASKONING

BIJLAGE 4
BREF "Energy efficiency Techniques"

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.1	Generic best practices	1) Implement energy saving techniques in the following order a. implement process related measures that decrease the energy demand b. manage utilities c. re-use of energy d. increase efficiency	Ja	-frekwentiesturing op pompen -DVI voor alle schepen -verschillende compressoren om energieverbruik DVI te minimaliseren
		2) Carry out a comprehensive energy audit using top-down and bottom-up approaches combining: a. First identify opportunities of energy saving/process e.g. energy consumption of motors b. Second check if these energy saving measures match with the bigger picture providing an increase of the overall energy efficiency	Ja	
5.2	Energy efficiency indicators (ei's)	3) Develop and use ei's in a continuous manner to demonstrate changes in energy efficiency 4) Develop ei's in a documented and transparent way by carrying out all of the following • Deciding and keeping the criteria for indicators the same over time, to make the assessment of energy efficiency possible • deciding clearly (e.g. what the criteria are, how to calculate them, units used) and keeping a record about the following criteria: • system boundary of production units and utilities different energy vectors • denominators in energy intensity factors and energy efficiency indexes in case of several products • correction factors in cases with 'structural' changes	ja	

BREF referentie	Onderwerp	BBT	Voldoet ja / nee	Onderbouwing niet voldoen + toelichting wel voldoen
5.3	Energy management structure and tools	5) have a standardized energy management system in place including all of the following: • Plan-do-check-act structure • Top management commitment • Continuous improvement of energy performance • Tools for collecting and assessing data and other information related directly or indirectly to energy efficiency 6) have an action plan to implement continuous improvement of energy performance 7) implement appropriate management and technical energy audits at these given times 8) use standardized and documented tools for auditing 9) use documented energy models and other tools for energy calculations 10) implement a comprehensive monitoring structure 11)carry out an external benchmarking of energy efficiency	Ja	
5.4.5	electric motor drive systems	27) use high efficiency motors (EFF1) 28) use variable speed drives	Ja	
5.4.	Pumping systems	30) implement a combination of the following measures - optimize flow conditions - improve control system - match the pump and the motor system	Ja	