

PRODUCT SPECIFIC REQUIREMENTS

FOR

BULK MARINE SHIPMENTS

OF

AROMATICS

BY

VESSELS and BARGES

PRODUCT SPECIFIC REQUIREMENTS FOR BULK MARINE SHIPMENTS OF AROMATICS

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Notes

These requirements are only applicable in conjunction with the respective DOW CHEMTERMS latest edition.

Word usage and intended meaning throughout this publication is:

- “**Shall**” or “**must**” indicates the application of a procedure is mandatory
- “**Should**” indicates the application of a procedure is recommended.
- “**May**” and “need not” indicates the application of a procedure is optional
- “**Will**” indicates future time. It never indicates any degree of requirement for application of a procedure.

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LIST OF APPLICABLE PRODUCTS

Product
(unhydr) Pyrolysis Gasoline
Aromatics concentrate
BTX
Heavy Pygas
Debutanizer Bottoms Pygas
Benzene
Toluene/ Xylene Mix // Blend TN100 // TX
Toluene
DCPD Crude
Me-DCPD
DCPD RG
DCPD UPRg
DCPD HP
C5 dienes crude
Blend TN120
Hydrocarbon blend 5-9
blend TN 160
blend TN 200 / CC9
Blend BN 200
Resin Feed
Resin Oil 80 / LA Blendstock
Aromatic oil
Blend TN350 / CBF
Fuel Oil blend
Fuel Oil Blend Low sulphur
Quench Oil
Heavy Fuel Oil

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SPECIFIC VESSEL REQUIREMENTS

EU Barge Type for Inland Waterways

EU single hull barges are not allowed. As all products are considered dangerous Goods the products require an N-type open or closed double hull barge or C-type barge depending on the product classification and properties. See below table for MINIMUM required barge type.

Product	Minimum Required Ship Type
(unhydr) Pyrolysis Gasoline	C ship
Aromatics Concentrate	C ship
Heavy Pygas	C ship
Debutanizer Bottoms Pygas	C ship
Benzene	C ship
Toluene/ Xylene Mix // Blend TN100 // TX	N,closed, DH
Toluene	N,closed, DH
DCPD Crude	N,closed, DH
Me-DCPD	N, open,DH
DCPD RG	N, open,DH
DCPD UPRg	N, open,DH
DCPD HP	N, open,DH
C5 dienes crude	C ship
Blend TN120	C ship
Hydrocarbon blend 5-9	C ship
blend TN 160	N,closed, DH
blend TN 200 / Crude C9	N,closed, DH
Blend BN 200	N,closed, DH
Resin Feed	N,closed, DH
Resin Oil 80 / LA Blendstock	N,closed, DH

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Aromatic oil	N,closed, DH
Blend TN350 / Carbon Black Feedstock	N,closed, DH
Fuel Oil blend	N,closed, DH
Fuel Oil Blend Low sulphur	N,closed, DH
Quench Oil	N,closed, DH
Heavy Fuel Oil	N,closed, DH

Note: DH = double hull

Cargo Tanks

Stainless steel cargo tanks or carbon steel tanks with no coating or with intact suitable type of coating are acceptable (see also section C. Cargo Tank Linings).

Cargo Pumps

Separate hydraulic or electric deep-well pumps for each cargo tank are recommended.

Pump room ships are acceptable, provided a written loading and discharge plan is developed (see also point 5 ‘Segregation of Liquid Line System’).

Liquid Line System

Liquid lines and stripping lines should be constructed of carbon steel or of stainless steel.

Seamless stainless steel hoses and chemical resistant lined (e.g. PP, PTFE) hoses (e.g. Chemflex) are suitable.

Segregation of Liquid Line System

Separate lines and manifold connections are required for each individual product handled.

Pump room vessels, or other vessels that do not have dedicated pumps and piping systems for each tank, or that have cross-ties or common lines (liquid or vent), must develop a written “loading and discharge plan” that will keep the transfer system segregated for each Dow product for the entire shipment.

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This plan must include the removal of spool pieces and the installation of blind flanges or SEUT valves to completely segregate each cargo from other cargoes and the ballast system from the time of loading until after discharge.

Common lines for different tanks (tank groups) are only acceptable if all respective tanks of the group will be loaded with the same Dow product. The vessel owner must notify Dow at the time of nomination that the vessel lacks full segregation and must provide a written plan.

If required to complete a “loading and discharge plan”, the vessel will provide a copy of the plan to the loading site, discharge site, and/or Dow representative. The surveyor at the load site will review the suitability of the segregation by reviewing the plan and inspecting the cargo system. A copy of the plan will be forwarded to the discharge location.

The surveyor will install seals to segregate the Dow product from other products and ballast systems on vessels that are required to develop a written “loading and discharge plan”. Seal numbers and their location will be recorded on the plan and forwarded to the discharge location.

Vapor Line System

Vapor lines should be constructed of carbon steel or of stainless steel. Common vapor lines must have fixed pipe connections to each cargo tank. Shore connection of the vapor line should be situated near the ships liquid connection. Seamless stainless steel hoses and chemical resistant lined (e.g. PP, PTFE) hoses (e.g. Chemflex) are suitable.

For EU barges AND regulations will be applied accordingly.

Segregation of Vapor Line System

A separate vapor line system is required for each individual product handled.

Vapor Emission Control

Controlled venting is required for all products. Vapor return may be required.

To allow compliance to local regulations with respect to degassing of barges carrying products containing (10% or more) Benzene it is not permitted to vent vapors from barge shipments containing Benzene and products containing more than 10% of Benzene, such as (unhydr) Pyrolysis Gasoline, Aromatics Concentrate, BTX, Debutanizer Bottoms Pygas, DCPD Crude and Heavy Pygas. Vapors shall **not** be led to the atmosphere in any case during loading, voyage or unloading; barges shall, if needed, be degassed at a degassing station.

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Utility Systems

Heating coils shall be segregated prior to loading. An integrity test has to be conducted and documented prior to start loading.

If inerting is required (see section B.10), cargo tanks shall be fitted with an automatic nitrogen pad system of sufficient capacity to maintain a positive cargo tank pressure during the entire voyage.

The oxygen content must be maintained at less than **8%-vol.** For more details see Section 10, "Inerting Requirements and Control".

Use of an inert gas generator is allowed.

The use of flue gas as inert gas is **not acceptable for Benzene, and DCPD UPRg or –HP.**

Inerting Requirements and Control

Loading

All products listed in **Section A** are flammable products with a flash point given in **Appendix 1**. They form an explosive mixture in air above the flash point temperature.

Therefore vessel cargo tanks to be loaded shall be purged with nitrogen either supplied by shore or, if applicable, inert gas generated by the vessel's IGS, if one of the following criteria are met:

product temperature to be loaded exceeds the flashpoint minus 5 deg C

or

temperature in the respective **vessel cargo tanks** exceeds the flashpoint minus 5 deg C

or

in cases where the vapors from the vapor space must be collected by a Vapor recovery shore system that cannot handle oxygen.

If the criteria are met as described above, the oxygen content in the cargo tanks shall be purged to less than **8%-vol.** prior to loading.

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For the product **DCPD High Purity** the tanks shall be purged to less than **5%-Vol** prior to loading.

For the products **Fuel Oil blend, Fuel Oil Blend Low Sulphur, Quench Oil, Heavy Fuel Oil, Carbon Black Feedstock (CBF) and Blend TN350** these purging requirements do not apply. However, purging may be required by local terminals, government entities, etc for products that are combustible.

Unloading

Unloading and partial unloading of the products listed in Section A, with the exception of **Fuel Oil blend, Fuel Oil Blend Low Sulphur, Quench Oil, Heavy Fuel Oil, Carbon Black Feedstock (CBF) and Blend TN350**, shall be done under supply of an inert gas phase to avoid forming an explosive mixture in the gas phase of the cargo tank.

General

During the voyage, the product temperature in the tank shall be controlled. The product temperature should be checked and documented at least twice a day.

All products mentioned in this document are poor conductors of electricity and can become electrostatic charged, even in grounded equipment. If sufficient charge is accumulated, sparks capable of igniting flammable mixtures can be formed.

Monitoring

Each cargo tank must be fitted with a level indicator with high level alarm.

Each cargo tank should be fitted with a temperature device to measure the liquid temperature at a minimum of two levels.

Each cargo tank must be fitted with a pressure device to measure the vapor space pressure. This helps ensure a vacuum is not created in the tank, thus pulling in oxygen.

Liquid and Vapor Sample Points

All cargo tanks should be equipped with means to connect a closed sampling device at a cargo line.

All cargo tanks should be equipped with a vapor sample point.

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Tank Inspection

At arrival tanks must be presented to Dow as clean, dry, and odor free to the satisfaction of the Charterer's Inspector, unless otherwise specified by Dow.

In all pump room vessels, all filter pot covers in the transfer system to be used by Dow cargo must be removed prior to arrival in order to facilitate inspection by a Dow representative and/or the independent surveyor prior to loading.

Provided the vessel operator has written permission from Dow, the vessel is allowed to utilize the Tank Inspection Alternative Process to forgo a surveyor tank inspection (including the wall wash where those are applicable). The Tank Inspection Alternative Process document can be found on the Dow Web Board.

Per the Tank Inspection Alternative Process, the vessel is required to provide the Dow Surveyor a tank cleanliness certificate prior to loading, and the vessel maintains all responsibility for any subsequent issues that may arise from cargo contamination.

Preparation for Loading

Vessels that do not have dedicated pumps and piping systems for each tank, or that have cross-ties or common lines (liquid or vent), must develop a written "loading and discharge plan" (review also Section "B 5." 'Segregation of Liquid Line System').

Cargo Transfer

Cargo loading should start at a reduced rate until sufficient level is reached in the cargo tanks to obtain samples and/or until the loading line is completely submerged.

Whenever possible, final analytical samples are taken from each cargo tank at approximately 80% load and individually analyzed. Vessel should only be released after analyses are completed or if approved by the respective plant quality representative.

If a vapor return line will be used always allow for positive or balanced replenishment of the vapor in the cargo tanks.

Cargo Custody

A pressure log should be maintained and presented to the surveyor upon request at the receiving location.

Due to the sensitivity of DCPD products to temperature and to oxygen content in the vapor space in the tanks, both oxygen and temperature should be monitored and recorded twice daily during the voyage.

In case of significant rise of temperature during transport of DCPD products the Emergency Number listed in the Material Safety Datasheet must be contacted for assistance on further actions to avoid a runaway reaction in the cargo tank (will occur when the temperature exceeds 150 deg C).

Upon request, the temperature and oxygen logs must be attached to the surveyor's report at the receiving location (review also Section E 'Adjacent Cargo and Temperature').

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CARGO TANK LININGS

A lining of the cargo tank is not required for the products listed in **Section A** of this document.

In case a lining is present in the cargo tank, this lining must be compatible with the product. In that case the vessel operator warrants that the linings are fully suitable for the cargo to be loaded and are intact with no active rust present.

The vessel's tank linings shall not be deemed intact until Charterer and/or its surveyor is in all respects satisfied that these requirements are fulfilled.

In case of any questions or doubts about the suitability of the tank lining, the respective Quality System Specialist, Business Quality Leader (or his / her designated representative) shall be contacted.

PRIOR CARGOES AND CONTENTS

1. Do not load Benzene, DCPD High Purity or DCPD UPRg after previous cargoes with a Gardner color greater than 3,0 (Platinum-Cobalt Color of 340).
2. As reference also review the U.S. Coast Guard compatibility charts (Title 46, Code of Federal Regulations, part 150, latest edition).
3. To maintain the product quality, restrictions on previous cargoes will be applied as stipulated in Table 1.

TABLE 1
LIST OF NOT ACCEPTABLE PREVIOUS CARGOES

Product:	Reason:
Aluminum Chlorid	Reactive
Hypochlorites	Reactive
Perchlorates	Reactive
Peroxides	Reactive
Sodium Dichromate	Reactive
Acids (Acrylic, HF, HNO ₃ , H ₃ PO ₄ , H ₂ SO ₄)	Reactive
Chlorohydrins	Reactive

4. Cleaning

Any **cleaning** has to be carried to achieve a **high purity standard**.

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- The vessel operator must have a written detailed cleaning procedure, describing each single washing step including the sequence with time, pressure, temperature, checks etc.
 - Cargo tanks must be cleaned in a **sufficient** and **appropriate** way.
A wall wash test may be performed by the Dow representative or the surveyor to verify the cleanliness of the respective cargo tank. Tests in addition to the standard wall wash test may be required to assess the effectiveness of cleaning.
 - Pumps, lines, manifold and valves must be **properly** cleaned under **sufficient pressure** and **time** e.g. by re-circulation.
 - After cleaning the tanks shall be clean, dry and odor free, ready for visual inspection
 - The use of a suitable and IMO approved cleaning agent is recommended.
 - The cleaning process must be documented according to the sequence of the procedure and has to be presented on request to the Dow representative or the Dow appointed surveyor at the load port.
2. The selection of the proper cleaning process and the cleaning is the sole responsibility of the vessel operator. Any product contaminated due to improper cleaning will be charged to operators account.
 3. In some situations it may be preferable not to clean a cargo tank prior to loading. If the previous cargo is compatible to the next cargo (see attached compatibility matrix of section G) and the vapor space of the vessel or barge is inertized (meets O2 requirements described in section B.10 of this document), cleaning of the barge may be omitted and the next cargo loaded on top of the heel.
 4. Exceptions to this requirement, if e.g. a vessel / barge is in a dedicated product service, this should be in agreement between the Quality System Specialist, The Business TS&D specialist and the Business Quality Leader (or his / her designated representative) and be covered by a specific procedure.

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ADJACENT CARGO TEMPERATURE

Temperature requirements at loading (in transit) and at discharge are given in below Table:

Product	Loading Temperature °C	discharge Temperature °C	Heating Coil Temperature °C
(unhydr) Pyrolysis Gasoline	ambient	ambient	ambient
Aromatics concentrate	ambient	ambient	ambient
BTX	ambient	ambient	ambient
Heavy Pygas	ambient	ambient	ambient
Debutanizer Bottoms Pygas	ambient	ambient	ambient
Benzene	> 10	> 10	> 10
Toluene/ Xylene Mix // Blend TN100 // TX	ambient	ambient	ambient
Toluene	ambient	ambient	ambient
DCPD Crude	< 50	< 50	< 50
Me-DCPD	< 50	< 50	< 50
DCPD RG	< 50	< 50	< 50
DCPD UPRg	20 - 35	20 - 35	20 - 35
DCPD HP	30 - 50	30 - 50	30 - 50
C5 dienes crude	< 30	< 30	< 30
Blend TN120	ambient	ambient	ambient
Hydrocarbon blend 5-9	ambient	ambient	ambient
blend TN 160	ambient	ambient	ambient
blend TN 200 / CC9	ambient	ambient	ambient
Blend BN 200	ambient	ambient	ambient
Resin Feed	ambient	ambient	ambient
Resin Oil 80 / LA Blendstock	< 50	< 50	< 50
Aromatic oil	20 - 50	20 - 50	20 - 50
Blend TN350 / CBF	40 - 75	40 - 75	40 - 75
Fuel Oil blend	ambient	ambient	ambient
Fuel Oil Blend Low sulphur	ambient	ambient	ambient
Quench Oil	ambient	ambient	ambient
Heavy Fuel Oil	ambient	ambient	ambient

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Appendix 1: TYPICAL PRODUCT (PHYSICAL) PROPERTIES

Product	UN Number	Flash Point	Boiling Point	Freezing Point	Viscosity @ 25 °C	Vapor Pressure @25 C	Specific Gravity	Solubility @ 20°C (in Water)	NFPA Rating Health	NFPA Rating Flammability	NFPA Rating Reactivity	Flammability Limits	Autoignition Temp.	Flammability class
		oC	oC	oC		cP		kPa	-	%	0 - 4	0 - 4	0 - 4	Vol % in air
(unhydr) Pyrolysis Gasoline	3295	-28	40 - 270	-10	0.652	9.3 - 30	0.8 - 0.9	<0.01	2	3 or 4	0	0.7 - 7.3	562	I-B
BTX	3295	-11 - +4	80 - 110	-95 - +5	0.6 - 0.7	2.9 - 10	0.87 - 0.88	0.1	3	2	0	1.2 - 7.1	536 - 562	I-B
Heavy Pygas	3295	> -28	40 - 270	-22	no data	9.3 - 30	0.87 - 0.88	no data	2	3	0	0.7 - 7.3	280	I-B
Debutanizer Bottoms Pygas	3295	< -50	30 - 170	no data	0.5	40 - 60	0.73 - 0.76	0.4 g/l	2	3	0	0.9 - 7.3	no data	1-B
Benzene	1114	-11	80	5.5	0.604	10	0.88	<0.01	2	3	0	1.2 - 7.8	498	I-B
Toluene/ Xylene Mix // Blend TN100 // TX	3295	-11 - 4	26 - 63	-95 - 13	no data	15.8	0.862 - 0.895	<0.01	2	3	0	1.0 - 7.1	536	I-A
Toluene	1294	4.4	110.6	-95	0.56 mPas	2.9	0.87	0.05	2	3	0	1.2 - 7.1	480	I-A
DCPD Crude	3295	35	~ 145	-25	no data	4.8	0.96	< 0.01	2	3	0	1.0 - 7.0	680	I-C
Me-DCPD	2048	49	170 - 190	-10	1.6	5.2	0.98	< 0.01	1	3	1	0.8 - 6.3	680	II
DCPD RG	2048	35	170 - 220	-25	1.7	0.8	0.97 - 0.99	0.1 g/l	1	3	1	0.8 - 6.3	680	I-C
DCPD UPRg	2048	35 - 45	170 - 190	0 - 10	no data	0.8	0.97 - 0.98	< 0.01	1	3	1	1.0 - 7.0	680	I-C
DCPD HP	2048	25	170	25	no data	0.3 - 0.8	0.99	< 0.01	1	3	1	0.8 - 6.3	680	I-C
C5 dienes crude	3295	-20	28 - 44	-100	0.37	62	0.67 - 0.69	2 g/l	1	4	0	1.0 - 8.9	> 220	I-A
Blend TN120	3295	-20	38	-100	0.51	50	0.74 - 0.78	1.8 g/l	2	3	1	0.8 - 8.9	510	I-A
Hydrocarbon blend 5-9	3295	< 0	30 - 190	no data	no data	82.7	0.75 - 0.85	insoluble	2	3	1	1.0 - 7.0	no data	1-A
Blend TN 160	3295	40	70 - 190	-40	0.9	0.8	0.88 - 0.94	205 g/l	2	3	1	0.9 - 6.8	510	II
Blend TN 200 / CC9	3295	40	130 - 315	-38	1.4	1.3	0.953 - 1.0	0.15 g/l	2	3	1	0.8 - 11	> 220	II
Blend BN 200	3295	40	110 - 315	-31	1.4	0.4	0.92- 1.0	0.15 g/l	2	3	1	0.8 - 11	> 220	II
Resin Feed	3295	51	160 - 220	-10	2 cSt	0.2	0.92 - 0.94	< 0.1 g/l	1	3	1	0.8 - 11	> 220	II
Resin Oil 80 / LA Blendstock	3295	45	167	< -30	1.1 - 1.9 mPas	20.7	0.92 - 0.97	0.108 g/l	1	2	2	1.0 - 7.0	400	I-C
Aromatic oil	3295	60 - 78	160 - 400	-10	4.2 cSt @ 50C	0.1	0.96 - 1.01	0.06	1	2	2	0.8 - 11	> 220	III-A
Blend TN350 / CBF	3082	62 - 145	72 - 390	43 - 63	215 mPas @ 40 C	0.1	0.96 - 1.11	25 - 41 g/l	2	2	1	1.0 - 7.0	453 - 480	III-A
Fuel Oil blend	1993	> 120 F	80 - 293	80	no data	0.1	0.97 - 1.04	negl.	1	3	1	0.7 - 5.0	540	III-A
Fuel Oil Blend Low sulphur	3082	> 61 C	> 148 C	80	no data	0.1	0.99	insol.	1	3	1	0.6 - 9.0	530	III-A
Quench Oil	1993	65	no data	-21	no data	3.3	8.22 lb/gal	< 0.02	2	2	0	no data	no data	III-A
Heavy Fuel Oil	1202	> 60	200 - 400	40	no data	0.2	0.95 - 1.01	no data	1	3	1	1.0 - 6.0	350	III-A
Cumene	1918	31	152	-96	0.74 mPas	0.4	0.86	52 mg/l	2	3	0	0.8 - 6.5	424	I-C

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Appendix 2: MARPOL DETAILS

Product	Marpol annex	IMO Shipping Name	IMO Ship Type	IMO Classification	IMO pollution category	High viscosity?	freezepoint	USCG compatibility group
(unhydr) Pyrolysis Gasoline	II C	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n		32
BTX	II C		2	3.1	Y	n	-95 - +5 °C	32
Heavy Pygas	II C	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n		32
Debutanizer Bottoms Pygas	II B	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n	no data	32
Benzene	II C	Benzene and mixtures having 10% benzene or more (i)	3	3.2	Y	n	5.5°C	32
Toluene/ Xylene Mix // Blend TN100 // TX	II C	Alkylbenzene mixtures (containing at least 50% of toluene)	3	3.2	Y	n		32
Toluene	II C	toluene	3	3.2	Y	n		32
DCPD Crude	II B	Pyrolysis gasoline (containing benzene)	2	3.3	Y	n		
Me-DCPD	II B	1,3-Cyclopentadiene dimer (molten)	2	3.3	Y	n		
DCPD RG	II B	1,3-Cyclopentadiene dimer (molten)	2	3.3	Y	n		30
DCPD UPRg	II B	1,3-Cyclopentadiene dimer (molten)	2	3.3	Y	n	0 - 10 °C	30
DCPD HP	II B	1,3-Cyclopentadiene dimer (molten)	2	3.3	Y	n	25 °C	30
C5 dienes crude	II B	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n		32
Blend TN120	II B	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n		32
Hydrocarbon blend 5-9	II B	Pyrolysis gasoline (containing benzene)	2	3.1	Y	n		32
blend TN 160	II A	Pyrolysis gasoline (containing benzene)	2	3.3	Y	n		32
Blend TN 200 / Crude C9	II B	Distilled Resin Oil	2	3.2	Y	n		32
Blend BN 200	II B	Distilled Resin Oil	2	3.2	Y	n		32
Resin Feed	II A	Distilled Resin oil	2	3.3	Y	n		32
Resin Oil 80 / LA Blendstock	II	Resin oil, distilled	2	3.3	Y	n		32
1- Octene	II B	octene (all isomers)	2		Y	n		30
Aromatic oil	II A	Distilled Resin oil	2	3.3	Y	y/n		
Blend TN350 / Carbon Black Feedstock	I	Annex 1 Oil			Oil	y	43 - 63 °C	32
Fuel Oil blend	I	Annex 1 Oil			Oil	y	80 °C	32
Fuel Oil Blend Low sulphur	I	Annex 1 Oil			Oil	y	80 °C	32
Quench Oil	I	Annex 1 Oil			Oil	y		32
Heavy Fuel Oil	I	Annex 1 Oil			Oil	y	40 °C	32

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Appendix 3: PRODUCT COMPATIBILITY MATRIX.

previous cargo:	next cargo:	(unhydr) Pyrolysis Gasoline	BTX	Heavy Pygas	Debutanizer Bottoms Pygas	Benzene	Toluene/ Xylene Mix // Blend TN100 // TX	Toluene	DCPD Crude	Me-DCPD	DCPD RG	DCPD UPRg	DCPD HP	C5 dienes crude	Blend TN120	Hydrocarbon blend 5-9	blend TN 160	blend TN 200 / CC9	Blend BN 200	Resin Feed	Resin Oil 80 / LA Blendstock	1- Octene	Aromatic oil	Blend TN350 / CBF	Fuel Oil blend	Fuel Oil Blend Low sulphur	Quench Oil	Heavy Fuel Oil	Cumene	Styrene	Ethylbenzene
(unhydr) Pyrolysis Gasoline		y	y	y	y	n	n	n	y	y	n	n	n	n	n	n	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
BTX		y	y	y	y	n	y	n	y	y	n	n	n	n	n	n	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Heavy Pygas		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Debutanizer Bottoms Pygas		y	y	y	y	n	y	n	y	y	n	n	n	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Benzene		y	y	y	y	y	y	n	y	y	n	n	n	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Toluene/ Xylene Mix // Blend TN100 // TX		y	y	y	y	n	y	y	y	y	n	n	n	n	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Toluene		y	y	y	y	n	y	y	y	y	n	n	n	n	y	y	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n
DCPD Crude		y	y	y	y	n	n	n	y	y	n	n	n	n	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Me-DCPD		y	n	y	y	n	n	n	y	y	y	n	n	n	y	y	y	y	y	n	n	n	y	n	n	n	n	n	n	n	n
DCPD RG		y	n	y	y	n	n	n	y	y	y	y	n	n	y	y	y	y	y	n	y	n	y	n	n	n	n	n	n	n	n
DCPD UPRg		y	n	y	y	n	n	n	y	y	y	y	y	y	y	y	y	y	y	n	y	n	y	n	n	n	n	n	n	n	n
DCPD HP		y	n	y	y	n	n	n	y	y	y	y	y	y	y	y	y	y	y	n	y	n	y	n	n	n	n	n	n	n	n
C5 dienes crude		y	n	y	y	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Blend TN120		y	y	y	y	n	y	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
Hydrocarbon blend 5-9		y	y	y	y	n	y	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
blend TN 160		y	y	y	y	n	y	n	n	n	n	n	n	n	y	y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n
blend TN 200 / CC9		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	n	y	n	n	n	n	n	n	n
Blend BN 200		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	n	y	n	n	n	n	n	n	n	n
Resin Feed		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	n	y	n	n	n	n	n	n	n
Resin Oil 80 / LA Blendstock		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	n	y	n	n	n	n	n	n	n
1- Octene		y	y	y	y	n	y	n	n	n	n	n	n	n	y	y	y	y	y	n	y	n	y	n	n	n	n	n	n	n	n
Aromatic oil		y	y	y	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Blend TN350 / CBF		n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Fuel Oil blend		n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Fuel Oil Blend Low sulphur		n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Quench Oil		n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Heavy Fuel Oil		n	n	y	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	y	y	y	y	y	y	n	n	n
Cumene		y	y	y	y	n	y	n	n	n	n	n	n	n	y	y	y	y	y	n	n	n	y	n	n	n	n	n	y	n	?
Styrene		y	y	y	y	n	y	n	n	n	n	n	n	n	y	y	y	y	y	n	n	n	y	n	n	n	n	n	n	y	?
Ethylbenzene		y	y	y	y	n	y	n	n	n	n	n	n	n	y	y	y	y	y	n	n	n	y	n	n	n	n	n	n	y	y

PRODUCT SPECIFIC REQUIREMENTS FOR BULK MARINE SHIPMENTS OF AROMATICS

Appendix 4: BARGE CLEANING CODES

Code	A	B	C	D	E	F	W	HW	NA	NC
<i>allowable product rest / residue in ship</i>	<i>< 2 m3</i>	<i>< 1 m3</i>	<i>< 100 kg</i>	<i>< 1 kg</i>	<i>none</i>	<i>none</i>	<i>none</i>	<i>none</i>	-	<i>any</i>
<i>allowable water rest in ship</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>some</i>	<i>dry</i>	<i>dry</i>	<i>dry</i>	<i>dry</i>	-	<i>n/a</i>
tanks empty and stripped.	Y	Y	Y	Y	Y	Y	Y	Y		
tankbottom dry		Y	Y	Y	Y	Y	Y	Y		
piping drained and empty: no significant residues			Y	Y	Y	Y	Y	Y		
tankbottom and piping rinsed with water				Y	Y	Y				
Ventilate (to ... ppm)					Y 150	Y 75				
wash (water)							Y			
wash with hot water								Y		
Not allowed. Consult your Dow rep.									Y	
No Cleaning Needed										Y