# bbe MOLDAENKE GmbH
# Ballast Water Workshop 2014

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Working together for a safer world

# Current status of the Convention

## Entry into force criteria

- 30 countries
- 35% of world fleet

## Current status of BWM

- 39 countries
- 30.38% of world fleet

## Outstanding 4.62%

| | Gross Tonnage % |
|---|---|
| Panama | 20.59% |
| Liberia | 11.65% |
| Marshall Islands | 7.29% |
| China, Hong Kong SAR | 6.73% |
| Singapore | 5.16% |
| Bahamas | 5.02% |
| Malta | 4.33% |
| Greece | 3.96% |
| China | 3.64% |
| Cyprus | 2.01% |
| United Kingdom | 1.90% |
| Italy | 1.77% |
| Japan | 1.67% |
| Norway | 1.58% |
| Germany | 1.47% |
| Isle of Man | 1.28% |
| Republic of Korea | 1.16% |
| Denmark | 1.14% |
| United States of America | 1.11% |
| Bermuda | 1.09% |
| Antigua and Barbuda | 1.07% |

# Application and key requirements

## All ships* >400 GT (inc submersibles, floating craft, floating platforms, FSUs and FPSOs) will be required to:

- Conduct ballast water and sediment **management** on all voyages
- Maintain and have on board an **approved** ballast water management **plan** and a ballast water record book
- Have **surveys** and **certification** in accordance with the Convention

## Exempt

- ships not designed to carry ballast water
- warships, naval auxiliaries or other ships owned or operated by a State, only on non-commercial service
- ships with permanent ballast water in sealed tanks

## International Ballast Water Management Certificate (IBWMC)

- Valid five years subject to:
  Annual surveys
  Intermediate survey
  Renewal survey

# Revised compliance schedule for ballast water treatment

EIF = Entry into force

- Ships constructed after EIF to comply from delivery

<table>
<tr><th>Ballast capacity</th><th>Existing ships Constructed (keel laying date) before 2009</th><th>Existing ships Constructed (keel laying date) in or after 2009 but before 2012</th><th>Existing ships Constructed (keel laying date) in or after 2012</th></tr>
<tr><td>Less than 1500m$^3$</td><td>EIF before 01/01/2017: by 1st IOPP** renewal survey after the anniversary of the delivery of the ship in 2016<br>EIF after 31/12/2016: by 1st IOPP renewal survey</td><td colspan="2" rowspan="2">By 1st IOPP renewal survey after EIF</td></tr>
<tr><td>Between 1500m$^3$ and 5000m$^3$</td><td>By 1st IOPP renewal survey after EIF</td></tr>
<tr><td>Greater than 5000m$^3$</td><td colspan="2">EIF before 01/01/2017: by 1st IOPP renewal survey after the anniversary of the delivery of the ship in 2016<br>EIF after 31/12/2016: by 1st IOPP renewal survey</td><td>By 1st IOPP renewal survey after EIF</td></tr>
</table>

# Revised compliance schedule for use of ballast water treatment systems

EIF = Entry into force

However if EIF occurs on or after 1 January 2016 then:

- Ships constructed after EIF to comply from delivery
- Existing ships to comply by 1st IOPP renewal survey after EIF

| | Ballast capacity | Date constructed | Compliance date |
|---|---|---|---|
| New vessels | All | On or after EIF | On delivery |
| Existing vessels | All | Before EIF | By 1st IOPP renewal survey after EIF |

# United States Coast Guard
# Ballast water management

- In response to national concerns, the National Invasive Species Act of 1996 (NISA) amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA).
- The Coast Guard has established both regulations and guidelines to prevent the introduction and spread of aquatic nuisance species (ANS).


- The Coast Guard's final rule was published on 23 March 2012 in the Federal Register, and became effective on 21 June 2012.

# United States Coast Guard Applicability

## Applies to

- All ships equipped with ballast water tanks; calling at US or Canadian waters; and intending to discharge ballast water

## Does not apply to

- Any Department of Defence or Coast Guard vessel; or any vessel of the Armed Forces
- Any warship, naval auxiliary, or other vessel owned or operated by a foreign state and used only on government non-commercial service

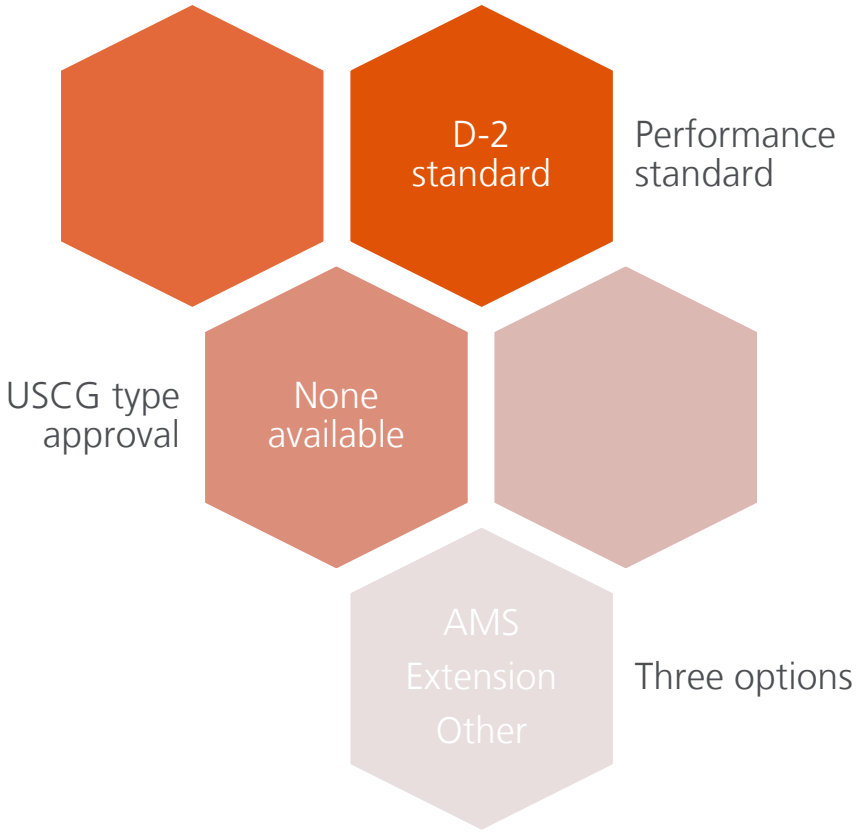
# United States Coast Guard Compliance schedule

| | Ballast capacity | Date constructed | Compliance date |
|---|---|---|---|
| New vessels | All | On or after 01 December 2013 | On delivery |
| Existing vessels | Less than 1,500 $m^3$ | Before 01 December 2013 | First scheduled dry docking after 01 January 2016 |
| Existing vessels | Between 1,500 $m^3$ and 5,000 $m^3$ | Before 01 December 2013 | First scheduled dry docking after 01 January 2014 |
| Existing vessels | Greater than 5,000 $m^3$ | Before 01 December 2013 | First scheduled dry docking after 01 January 2016 |

# United States Coast Guard
# Additional rules

- Clean ballast tanks
- Rinse anchors and chains
- Remove fouling
- Maintain a plan
- Maintain records
- Submit report 24 hours before

# United States Coast Guard Type-Approval



# United States Coast Guard
# Alternate Management System

- Document review of foreign type approved system
- Temporary solution
- Not guaranteed to achieve US TA
- Five years

**Alternate Management Systems[1] (AMS) Accepted by the U.S. Coast Guard**
**12 February 2014**

| Manufacturer | System Name | Accepted Models | Acceptance Date | AMS Identification No. | Accepted for Use in | | |
|---|---|---|---|---|---|---|---|
| | | | | | Freshwater[2] | Brackish[3] | Marine[4] |
| Alfa Laval Tumba AB - Sweden | PureBallast | Models 250 to 2500 with associated filters | 15-Apr-13 | AMS-2013-AlfaLaval-PureBallast-001 | | X | X |
| Alfa Laval Tumba AB - Sweden | PureBallast | Models 2.0 and 2.0Ex with associated filters | 15-Apr-13 | AMS-2013-AlfaLaval-PureBallast-002 | | X | X |
| Aqua Engineering Company, Ltd. – Korea | AquaStar | Models H-200, -200S, -250, -300, -350, -450, -550, -650, -700, and -750 | 7-Jan-14 | AMS-2014-AquaStar-001 | | X | X |
| Aqua Engineering Company, Ltd. – Korea | AquaStar-EX | Models H-200S-EX, -300-EX, -350-EX, and -650-EX | 7-Jan-14 | AMS-2014-AquaStar-002 | | X | X |
| Auramarine, Ltd. – Finland | CrystalBallast | Models CB75 and CB250 with associated filters | 7-Jan-14 | AMS-2014-Auramarine CrystalBallast-001 | | X | X |
| COSCO Shipbuilding Industry Company - China | Blue Ocean Shield | Models BOS02 and BOS05, with treatment rated capacities of 100 to 3,500 m3/hr, with associated filters | 19 Nov-13 | AMS-2013-COSCO BOS-001 | | X | X |
| DESMI Ocean Guard A/S - Denmark | OxyClean | Models OxyClean 75, -100, -200, -300, -400, -500, -600, -700, -800, -900, -1000, -1200, -1300, -1400, -1500, -1600, -1700, -1800, -1900, -2000, -2100, -2200, -2300, -2400, -2500, -2600, -2700, -2800, -2900, and -3000, with associated filters | 11-Oct-13 | AMS-2013-DESMI-OxyClean-001 | X | X | X |
| Ecochlor Inc. - USA | Ecochlor | Series 75, 100, 150, 200, 250, and 300, with filter models BS-050 to BS-1200 | 15-Apr-13 | AMS-2013-Ecochlor-001 | | X | X |
| ERMA FIRST ESK Engineering Solutions SA - Greece | ERMA FIRST | Models BWTS 50, -100, -200, -300, -400, -500, -600, -700, -800, -900, -1000, -1100, -1200, -1300, -1400, -1500, -1600, -1700, -1800, -1900, -2000, -2100, -2200, -2300, -2400, -2500, -2600, -2700, -2800, -2900, and -3000, with associated filters | 11-Oct-13 | AMS-2013-ERMA FIRST BWTS-001 | | X | X |

Notes:
[1]Only the specific configuration and components of the BWTS, as type-approved by a foreign administration, are accepted for use as an AMS in U.S. waters.
[2]An AMS accepted for use in freshwater must be tested at a practical salinity unit (PSU) concentration of less than 1 PSU ([x] < 1PSU).
[3]An AMS accepted for use in brackish water must be tested at a PSU concentration between 10 and 20 PSU (10 PSU < [x] < 20 PSU).
[4]An AMS accepted for use in marine water must be tested at a PSU concentration between 28 and 36 PSU (28 PSU < [x] < 36 PSU).

# United States Coast Guard Extensions

- Despite all efforts
- Process in-place
- 12 months before
- Compliance at the end
- Can re-apply at the end

# EPA and USCG - Consistencies

| | |
|---|---|
| Implementation schedule | Implementation schedule |
| Exemptions | Exemptions |
| USCG type approval | USCG type approval |
| AMS | AMS |

# EPA and USCG - Inconsistencies

VGP

Periodic sampling

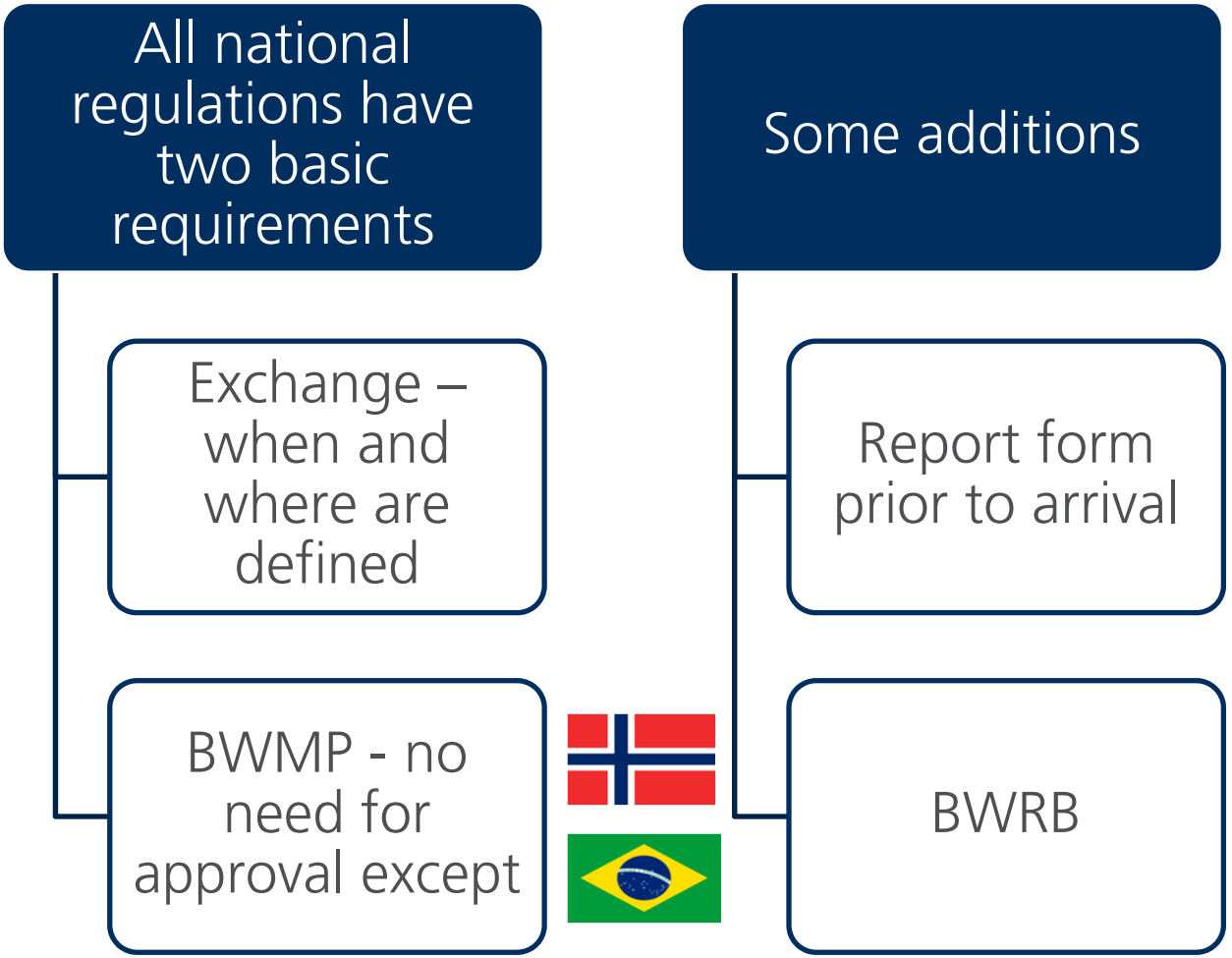
Exchange + treatment (Great Lakes)

Annual report

Active substance discharge limitations

Extensions

# What do other national regulations require?



# BWM systems: Statutory type approvals

## Flag Admin

- All systems to be approved to G8

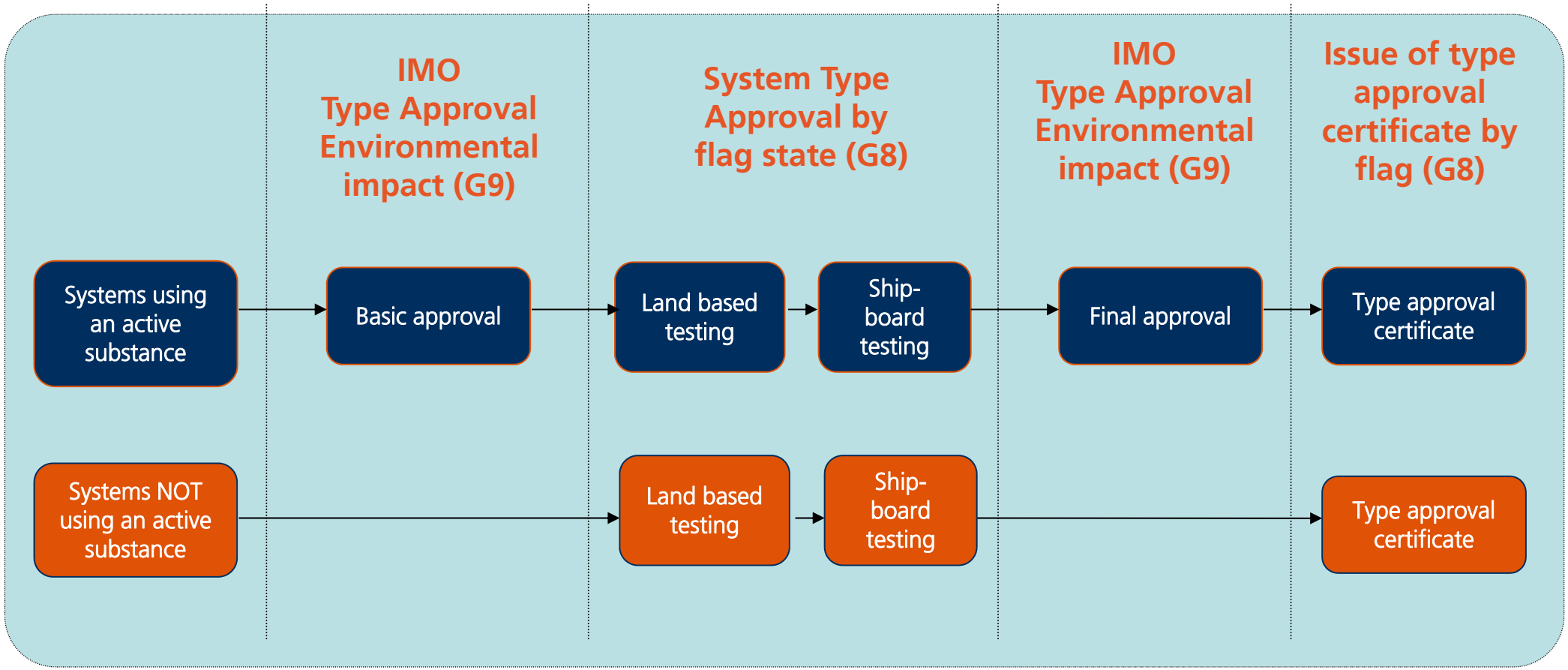
## IMO

- All systems uses or produces active substance to be approved to G9

## lr.org/bwm

- 34 systems type approved to G8
- 31 systems type approved to G9

# The statutory type approval process



# BWM systems: Class type approval

**When installing BWTS on board LR classed ship, the BWTS and the ship-specific installation are to comply with the LR Rules.**

BWTS design approval

Machinery General Design Appraisal

Class approval of ship specific installation

Design Appraisal Document

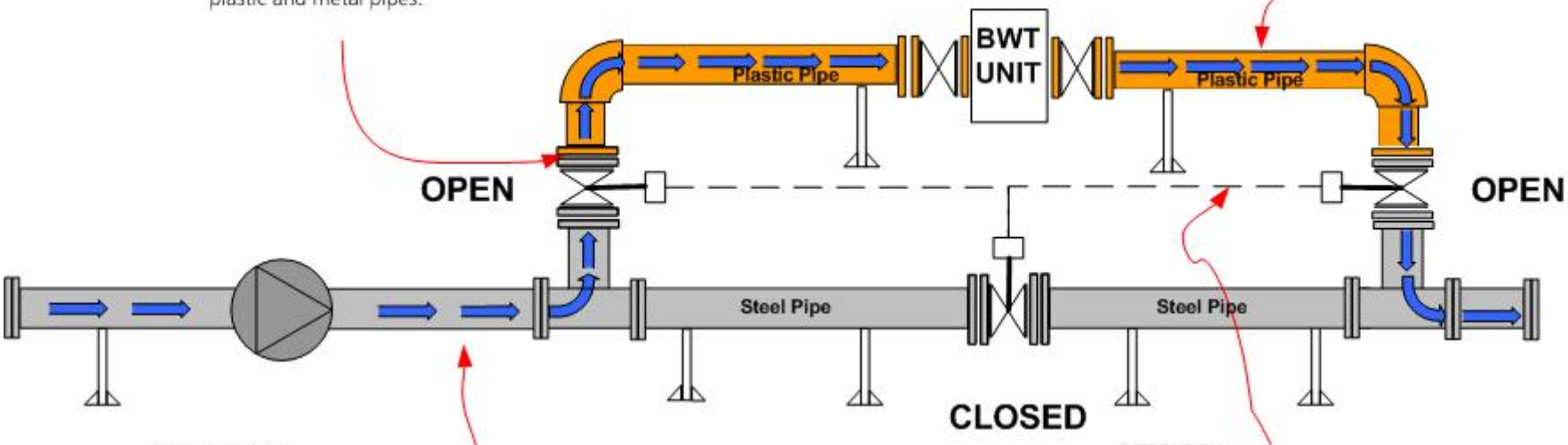
# BWTS: Lloyd's Register Rules

BYPASS VALVE

Flanged valve only, cannot accept wafer or lug-type. Part 5, Chapter 12 Section 5.7.7 The required fire endurance level of the pipe is to be maintained in way of pipe supports, joints and fittings, including those between plastic and metal pipes.

MATERIALS

Part 5, Chapter 12 Section 1.1.2 The materials used for pipes, valves and fittings are to be suitable for the medium and the service for which the piping is intended. Part 6, Chapter 2 Section 1.12 Static electricity




BALLAST MAIN

Part 6, Chapter 2 Section 1.5 Essential services are those necessary for the propulsion and safety of the ship, Ballast pumps are included. Materials sensitive to heat are not to be used in piping systems essential to the safe operation of the ship, or containing seawater where leakage or failure could result in fire or in flooding.

INTERLOCK

Part 5, Chapter 12 Section 6.1.4 Where valves are required to be capable of being closed remotely in the event of fire, the valves, including their control gear, are to be of steel construction or of an acceptable fire tested design.

# BWTS: LR Specific ship installation Approval

- Submission and review of **ship's specific installation plans** against LR Rules which covers:
  - Safe integration of BWTS with other systems
  - Effects on other shipboard systems
  - Installation location
  - Stability, structural, fire and watertight integrity
  - Piping and electrical cable routing
  - Contingency measures to mitigate operational hazards
  - Appraisal of components outside scope of supply from BWTS manufacturer
  - Electrical installations in hazardous areas
  - Safe storage and handling of chemicals
  - Installation to manufacturers recommendations etc

**On request from ship builder or owners for retrofits**

**Mandatory for each installation**

# Feedback from retrofits

- Always undertake onboard measurements
- Consider impact of BWTS on the flexibility of the ballast system
  - Is it possible to use fire pump in case ballast pump is out of service?
- GRE vs steel piping?
- For systems that require galvanised piping, specify compression fittings to prevent damage to pipe linings
- Minimise ballast water piping in the engine room
- Keep BWTS close to switchboard to simplify cable runs

# Feedback from retrofits

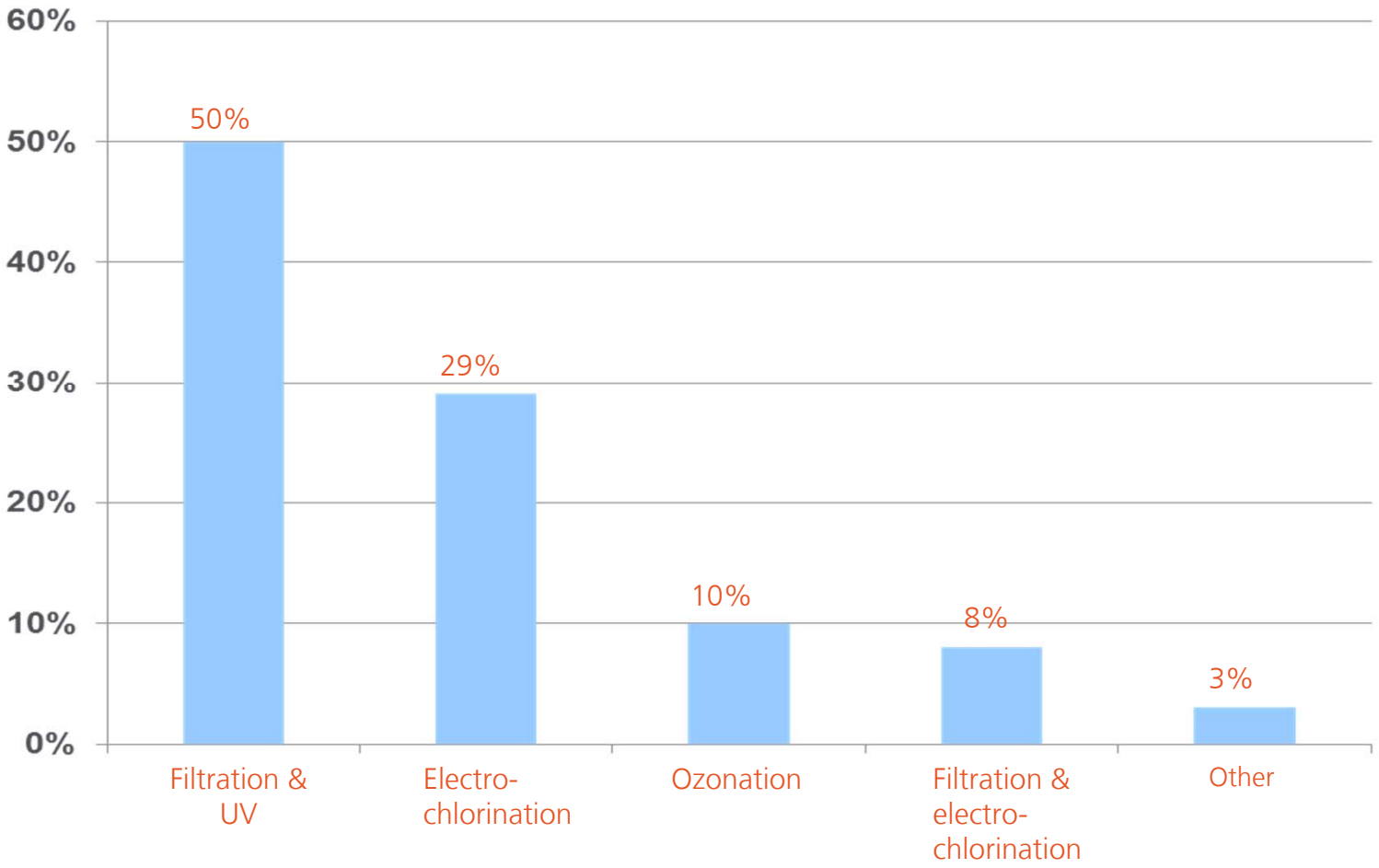
- Additional services may be required:
  - Fresh water supply may be required to wash components when maintaining electro chlorination systems
  - Air supply to back flush filters
  - Lighting
  - Fire detection
  - Fire extinguishing
  - Handrails
  - Additional bilge to capture water spilled during maintenance

- Maintaining fire protection
  - Penetrations through bulkheads

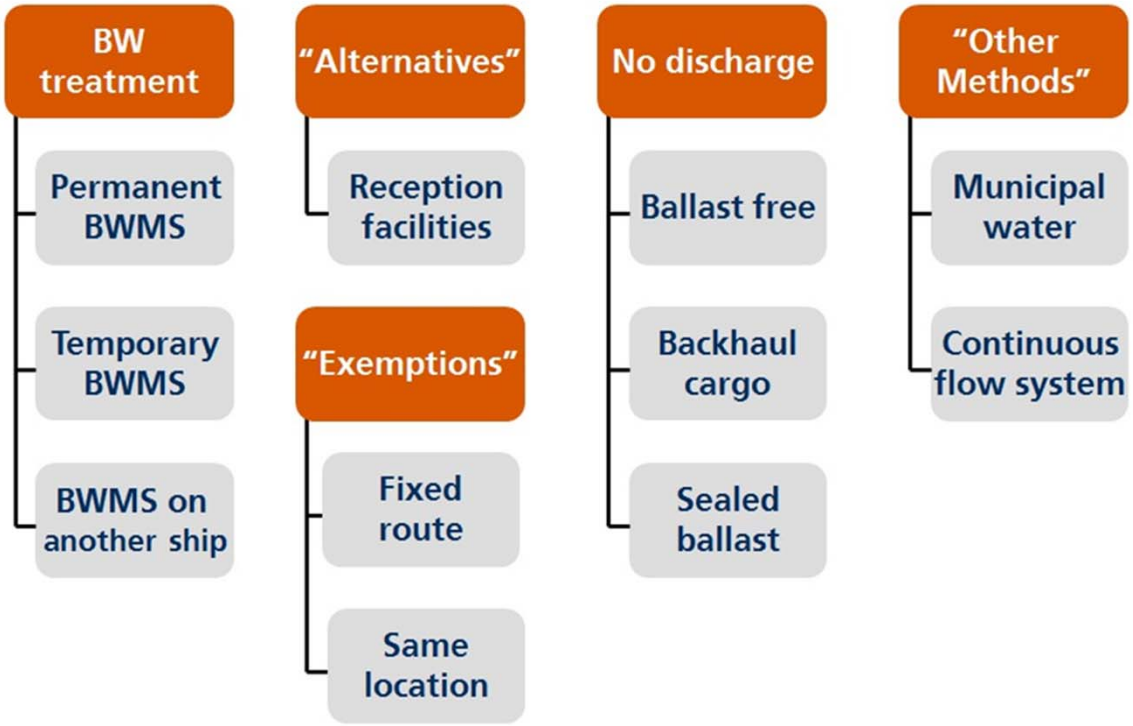
# Feedback from retrofits

- Access for installation
  - Getting major items of equipment into position
  - Is it possible to get the spanner onto the bolt head?
- Maintenance footprint
- Automation
- Hotel arrangements and LSA for install team (if on passage)
- Update ship's drawings
- Crew training / documentation

# BWTS technology selected for LR class new builds in Korea & China



# Are there other compliance options ?




- Other compliance options are available:
- Exemptions
- Shore reception facilities
- BW reception barges
- BW treatment barges

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