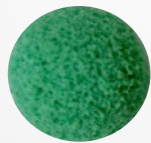
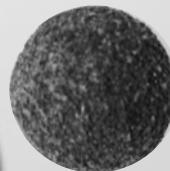




**SPP  HYDROTECH**



**Cleaning Balls**



# The most important tool of an On-Load Tube Cleaning System comes in shape of a Ball.

**SPP HYDROTECH** cleaning balls are optimized and designed to operate with any brand of On-Load tube cleaning system. To achieve the best possible tube cleaning result, it is important to select the correct cleaning ball type and its perfect operational mode. **SPP HYDROTECH** with its wealth of experience in off-load cleaning and on-site re-tubing is the right partner for this task.

Our experts are always at hand to support our customers, not only in terms of cleaning optimization, but also in terms of operational optimization.

## **Management Statement**

The management of **SPP HYDROTECH Co., Ltd.** is determine not only to provide a high quality product to our valued customers but also to protect the environment and respect the rights of the people working for us.

By working closely with the original developer of the sponge rubber cleaning balls, enjoying the support of the Thai Rubber Institute and by employing state of the art machinery in our plant we ensure that our products meets or exceeds the expected quality standard of our customers.

As a responsible manufacturer we respect national and international labor laws. With regular, but unscheduled inspections of the rubber plantations and processing plants we ensure that no child labor nor forced labor is involved. A record of the inspections is kept.

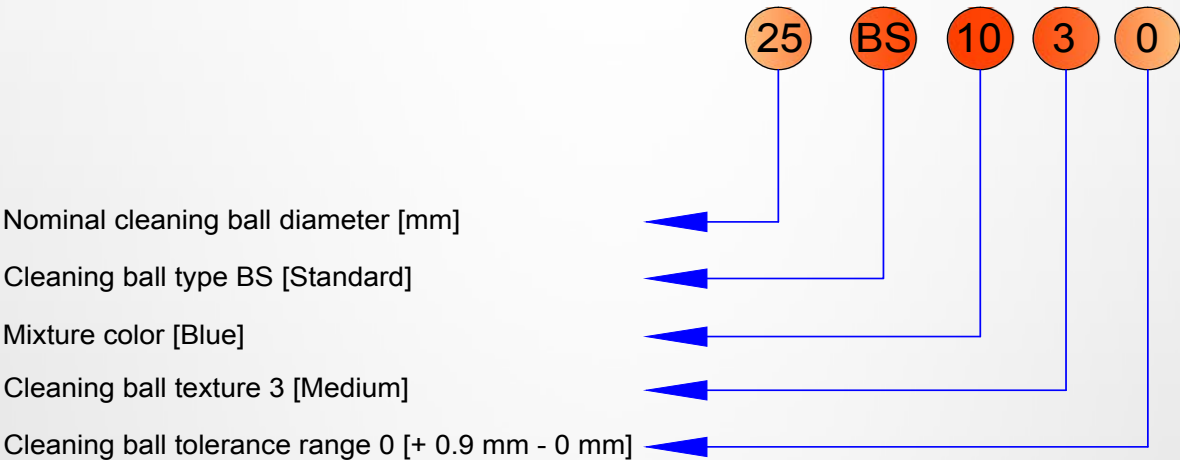
## **Quality**

Since the cleaning ball is the essential tool to maintain the cleanliness and therefore the efficiency of the condenser, an extensive quality assurance program with state of the art laboratory equipment has been implemented. This quality assurance program starts at the rubber processing plant and follows through the entire manufacturing process. The recorded results for every batch are kept for future reference.

**SPP HYDROTECH** cleaning balls, engineered in Germany, manufactured in Thailand under German supervision.

# How to Order a Cleaning Ball

## ORDERING DATA EXAMPLE



Cleaning Ball Type
BS = Standard Ball
BP = Polishing Ball
BG = Plastic Granulate Ball
BR = Abrasive Ring Coated Ball
BT = Abrasive Totally Coated Ball
BST = Standard Ball High Temperature
BSTL = Standard Ball High Temperature, Low Sinking Velocity
BRT = High Temperature Ball Abrasive Ring Coated
BTT = High Temperature Ball Total Abrasive Coated

Cleaning Ball Colour
10 = Blue
20 = Red
30 = Brown
40 = Green
50 = Yellow
Other colours upon request.

Degree of Hardness
1 = Soft
2 = Medium Soft
3 = Medium
4 = Medium Hard
5 = Hard
6 = Super Hard

# SPP HYDROTECH Cleaning Balls for Operating Temperatures up to 80 ° C

## **Cleaning Balls with Polishing Agent \* Type BP**

Application:	Cleaning Frequency:
➤ Stainless Steel Tubes and Titanium Tubes	12 Balls / Hour and Tube
➤ Copper Based Alloys	
In Fresh Water [ $< 1000 \mu\text{S}/\text{cm}$ ]	12 Balls / Hour and Tube
In Brackish Water [ $> 1000/<10000 \mu\text{S}/\text{cm}$ ]	Examination Required
In Seawater without $\text{FeSO}_4$ Dosing	6 – 12 Balls / Day and Tube
In Seawater with $\text{FeSO}_4$ Dosing	Depending on Dosing Intervals

- This Cleaning Ball can be applied as Standard Ball

## **Cleaning Balls with Polishing Agent and Reduced Sinking Velocity Type BPL**

Application:	Cleaning Frequency:
➤ Stainless Steel Tubes and Titanium Tubes	See Above
➤ Copper Based Alloys	

This Cleaning Ball is Sinking Slower than the BP Ball

## **Cleaning Balls for Copper Based Alloy Tubes Type BS**

Application:	Cleaning Frequency:
Copper and Brass Tubes	See Type BP
(Particularly in combination with Ferrous Sulfate dosing)	

## **Standard Cleaning Balls Coated with Plastic Granulate Type BG**

Application:	Cleaning Frequency:
Tubes Contaminated with Particularly Strong Biofouling. Suitable for Stainless Steel, Titanium and Brass Tubes	Stainless Steel / Titanium 12 Ball / Hour and Tube. Copper / Brass Tubes see Type BP

# SPP HYDROTECH Cleaning Balls for Operating Temperatures up to 80 ° C

## Cleaning Balls with Abrasive Ring Coating Type BR

Application:  
Tubes Contaminated with Hard Scaling and  
Removal of Porous Cover Films, such as  
Ferrous Sulfate.

Cleaning Frequency:  
Cleaning Frequency and Ball Quantity  
should be Determined by Tests.

Note: Due to the abrasiveness, this cleaning balls should not be treated as standard balls.

## Cleaning Balls with Total Abrasive Coating Type BT

Application:  
Tubes Contaminated with Hard Scaling and  
Removal of Porous Cover Films, such as  
Ferrous Sulfate.

Cleaning Frequency:  
Cleaning Frequency and Ball Quantity  
should be Determined by Tests.

Note: Due to the abrasiveness, this cleaning balls should not be treated as standard balls.



On-site video inspection by **SPP HYDROTECH**. To make the right choice of the cleaning ball type in view of cooling water type, tube material and operating parameters is very important.

# SPP HYDROTECH Cleaning Balls for Operating Temperatures up to 120 °C

## **Standard Cleaning Balls for High Temperatures Type BST**

Application:  
For Operating Temperatures of up to 120 °C,  
as in Evaporators of Desalination Plants.

Cleaning Frequency:  
Two Balls / Hour / Tube with a Ball  
Quantity of 30% of the Tubes (1<sup>st</sup> Stage  
of Evaporator)

Note: The Ball Hardness is 3 (Medium), 4 (Medium Hard) and 5 (Hard)

## **Standard Cleaning Balls for High Temperatures Type BSTL**

Application:  
For Operating Temperatures of up to 120 °C,  
as in Evaporators of Desalination Plants.

Cleaning Frequency:  
Two Balls / Hour / Tube with a Ball  
Quantity of 30% of the Tubes (1<sup>st</sup> Stage  
of Evaporator)

Note: The Ball Hardness is 3 (Medium), 4 (Medium Hard) and 5 (Hard)  
The Sinking Velocity is Reduced

## **Cleaning Balls with Abrasive Ring Coating Type BRT**

Application:  
Tubes Contaminated with Hard Scaling

Cleaning Frequency:  
Cleaning Frequency and Ball Quantity  
should be Determined by Tests.

Note: Due to the abrasiveness, this cleaning balls should not be treated as standard balls.

## **Cleaning Balls with Total Abrasive Coating Type BTT**

Application:  
Tubes Contaminated with Hard Scaling

Cleaning Frequency:  
Cleaning Frequency and Ball Quantity  
should be Determined by Tests.

Note: Due to the abrasiveness, this cleaning balls should not be treated as standard balls.

## General Information

### Basic Charge

The basic charge of cleaning balls is calculated from the number of tubes per pass. It is recommended that each tube receives a cleaning ball in average every five minutes. The generally guideline is, that the quantity of cleaning balls equals about 10% of tubes per pass. For batch system, however, the basic charge should be between 30% to 50% of the number of tubes per pass.

### Selection of Ball Size

Depending on the pressure lost across the condenser tube, usually the cleaning ball is between 1 to 3 mm oversized.

### Cleaning Ball Distribution

The distribution of the cleaning balls in the condenser depends on different factors, such as ball injection points, flow pattern in the water box and the type of cleaning balls chosen.

### Advisory Service

Our specialists will gladly answer your queries regarding selection and use of our cleaning balls. Contact us directly or via our local partner.



### Ball Life

The ball life depends to a big extend on the cleaning frequency and the tube inner surface condition. It is typically about four weeks, but can be also much longer. Scaled and corroded surfaces have a detrimental effect on ball life. The use of abrasive balls can be considered to smoothen the tube surface in case of excessive ball wear.

### Storage

It is important that cleaning balls are stored in a cool, dry place and away from direct sunlight. With proper storage the cleaning balls have a shelf life of several years.

## General Information

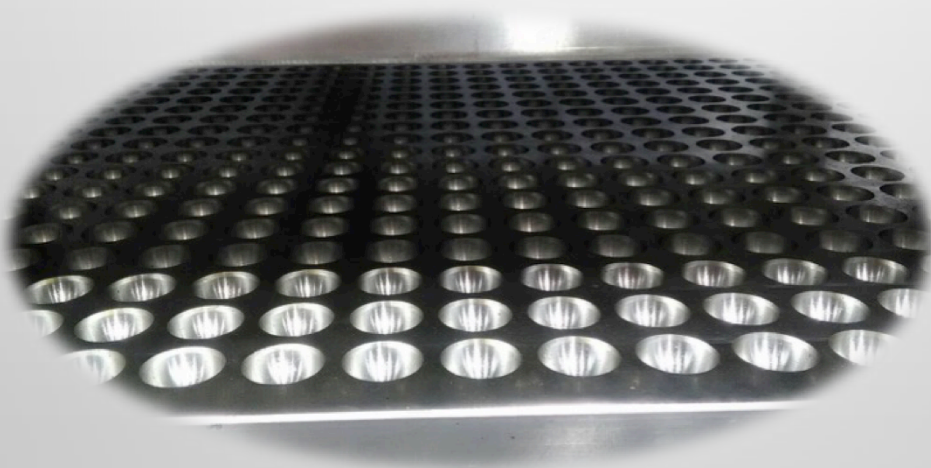
**SPP HYDROTECH's cleaning balls are designed to work with any brand of on-load condenser tube cleaning system**

Since Thailand is the world biggest producer of natural rubber, the required natural rubber type and quality is available in abundance.



With our well trained employees and modern manufacturing plant, we produce the complete range of condenser tube cleaning balls.

Prior to processing, every batch is tested in our own laboratory and the test results are filed for reference.



# General Information

## Typical problems in fresh water cooled power plants

Cooling water / tube material	Characteristics	Potential problem	Tube cleaning system	Comments*
<b>Fresh water</b>				
Copper-based alloys	low chloride content	silt	1-24h/day with <b>standard ball</b> to maintain heat transfer	water is usually not aggressive; general corrosion rarely a problem but localised attack (silt, sulphides, manganese) possible; few restrictions on use of coated balls ( <b>granulate</b> or <b>abrasive</b> ) or <b>scouring balls</b>
		manganese-rich deposits	frequent use of <b>abrasive-coated balls</b> may be necessary	
Austenitic stainless steels	low chloride content	silt	risk of <b>deposit attack</b> 1-24h/day with <b>standard ball</b> to maintain heat transfer	
		bio-fouling	use <b>granulate-coated balls</b> or <b>scouring balls</b> frequently to remove thin adherent layer	
		manganese-rich deposits	frequent use of <b>abrasive-coated balls</b> may be necessary	

\* Important: The comments made here are for guidance only. A specific case needs to be considered carefully before measures are implemented.

## Typical problems with recirculating cooling

Cooling water / tube material	Characteristics	Potential problem	Tube cleaning system	Comments*
<b>Brackish water / seawater</b>				
Aluminium brass	high chloride content (often high silt content, especially near estuaries); pollution may be an added problem	erosion-corrosion	keep operation of tube cleaning system to a minimum	high risk of enhanced corrosion; do not use <b>abrasive-coated balls</b> ; possibly use <b>ferrous sulphate</b>
		deposit attack	compromise between tube cleanliness and corrosion; possibly combined use of ball cleaning and <b>ferrous sulphate dosing</b>	aluminium brass has only limited corrosion resistance; <b>ferrous sulphate dosing</b> can be beneficial
		sulphide corrosion due to pollution		use non-standard cleaning balls with care; <b>ferrous sulphate dosing</b> can be beneficial
		manganese-rich deposits		use non-standard cleaning balls with care
Copper nickel / austenitic stainless steel	ditto	deposit attack	operate tube cleaning system to keep tubes clean	use non-standard cleaning balls with care
Titanium / newly developed stainless steels	ditto	bio-fouling manganese-rich deposits	use of non-standard cleaning balls necessary ( <b>granulate-coated balls</b> , <b>scouring balls</b> )	no risk of enhanced corrosion, no restrictions on use of tube cleaning system

\* Important: The comments made here are for guidance only. A specific case needs to be considered carefully before measures are implemented.

# General Information

Typical problems in plants cooled by brackish water or seawater

Cooling water / tube material	Characteristics	Potential problem	Tube cleaning system	Comments*
<b>Brackish water / seawater</b>				
Aluminium brass	high chloride content (often high silt content, especially near estuaries); pollution may be an added problem	erosion-corrosion	keep operation of tube cleaning system to a minimum	high risk of enhanced corrosion; do not use abrasive-coated balls; possibly use ferrous sulphate
		deposit attack	compromise between tube cleanliness and corrosion; possibly combined use of ball cleaning and ferrous sulphate dosing	aluminium brass has only limited corrosion resistance; ferrous sulphate dosing can be beneficial
		sulphide corrosion due to pollution		use non-standard cleaning balls with care; ferrous sulphate dosing can be beneficial
		manganese-rich deposits		use non-standard cleaning balls with care
Copper nickel / austenitic stainless steel	ditto	deposit attack	operate tube cleaning system to keep tubes clean	use non-standard cleaning balls with care
Titanium / newly developed stainless steels	ditto	bio-fouling manganese-rich deposits	use of non-standard cleaning balls necessary (granulate-coated balls, scouring balls)	no risk of enhanced corrosion, no restrictions on use of tube cleaning system

\* Important: The comments made here are for guidance only. A specific case needs to be considered carefully before measures are implemented.



## General Information

For further information please kindly contact:

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Pananikhom, Nikhompattana

Rayong 21180

Thailand

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Or our local partner