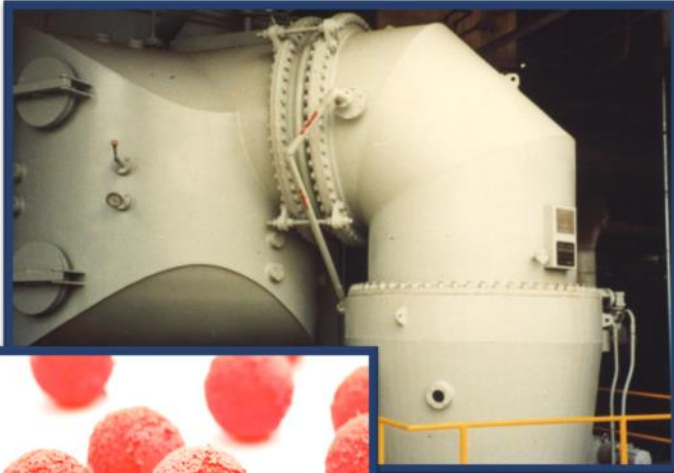


ZERO BALL LOSS (ZBL) – R TYPE

CONDENSER TUBE CLEANING SYSTEM



PURPOSE

- ◆ This is a sponge-ball type tube-cleaning system. This equipment is the improvement of the standard CTCS system:
- ◆ In spite of upstream screens and strainers:
 - ◇ Dissolved chemicals precipitate and build into scale on the tube surface
 - ◇ Biological elements settle and grow on the tube surface
 - ◇ Fine mineral particles deposit on the low-velocity boundary and combine with the biological growth
- ◆ As a result, the heat transfer by the tubes is much reduced and the plant's loss of generation can be 3% or more
- ◆ Fitting a BEAUDREY CTCS eliminates the above problems. The system is used in all plants with tubular exchangers and condensers

DESCRIPTION

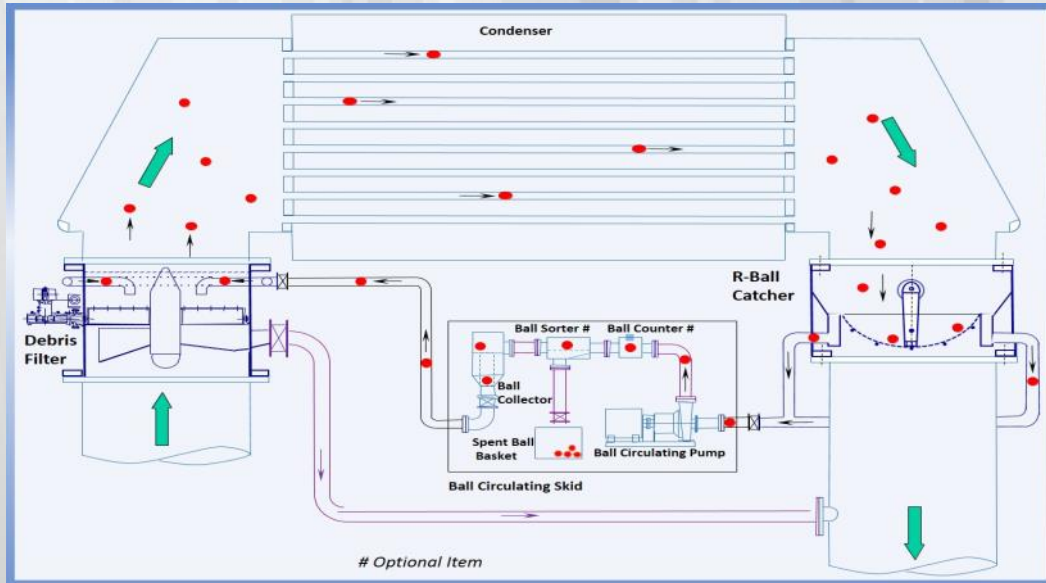
- ◆ The BEAUDREY ZBLR ball-catcher consists of a flanged spool piece in which a curved, fixed, concave ball-arresting bar screen is installed. It cannot be by-passed by the balls. An oscillating raking arm with a comb sweeps the balls towards the ball-collection boxes on each side of the rack from where they exit towards the ball-handling skid which comprises the ball pump, the ball counter and collector and the worn ball remover (optional)
- ◆ The optional ball counter and undersize ball remover are also skid mounted
- ◆ When in circulation, the balls travel back to the upstream side of the condenser where they are injected into the incoming cooling water. As the size of the balls is slightly larger than the diameter of the tubes, they squeeze into the tubes, pushed by the condenser head-loss. The balls sweep the tubes clean before exiting from the condenser towards the ball catcher

ADVANTAGES

- ◆ No possible ball escape to the environment
- ◆ Constant efficiency
- ◆ Most economical system on the market
- ◆ Small-bore piping only and small ball pumps
- ◆ Very compact, fits where no other system fits
- ◆ Eliminates periodical shut-downs for manual tube-cleaning
- ◆ Eliminates periodical chemical cleaning
- ◆ Can easily be retrofitted to existing plants
- ◆ Short pay-back time (often less than 18 months)



LAYOUT



TRADITIONAL PROBLEM	BEAUDREY ZBL R SOLUTION
High ball loss caused by a damaged grid, incorrect grid positioning, or a grid clogged with debris.	Designed so that there is no escape path for the sponge balls, making the Beaudrey ZBL R environmentally compatible.
Ball count can drop below the optimal level as they are leaked out of the tube cleaning system. Less balls directly results in a lower heat exchanger efficiency	The Beaudrey ZBL R can be equipped (optional) with a continuous ball monitoring system that will trigger an alarm if the ball count is low.
Worn out balls circulating through the system are not efficient due to undersized diameter.	Undersized balls are automatically removed from the condenser during the continuous ball sorting process of the ZBL.

Components	Materials for Fresh Water Applications	Materials for Sea-water applications
Shell	Painted CS	Lined CS, Duplex Super Duplex
Internals	304L 316L	316L Duplex Super Duplex
Ball-arresting grids	304L 316L	316L Duplex Super Duplex
Ball pump	Cast iron internally lined	Duplex Super Duplex
Ball Collector	304L 316L	316L Duplex Super Duplex
Skid pipework	HDPE	HDPE

SIZES AND STANDARDS

- ◆ Standard sizes from DN500 (12") to DN3200 (128")
- ◆ Larger machines and special shell dimensions on special order
- ◆ Head-loss about $1.5 V^2/2g$ in most cases, "V" being the inlet velocity in the spool piece.
- ◆ Ball strainers are designed and manufactured in accordance with international standards:
ISO-DIN-ASME-AWWA.

ANCILLARIES AND OPTIONS

- ◆ Necessary ancillaries
 - ◇ Differential pressure sensor
 - ◇ Electrical control cabinet
- ◆ Optional features
 - ◇ Inspection manholes
 - ◇ Undersize ball sorter / remover
 - ◇ Ball counter
 - ◇ Flow straightener



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