Comparison Table of Factors Which Affect Materials of Construction of Cooling Towers

	REYMSA FRP TOWERS	GALVANIZED STEEL TOWERS	COATED GALVANIZED STEEL TOWERS	STAINLESS STEEL TOWERS
Life Expectancy	30 – 35 years [1,5]	10 – 15 years [2]	10 – 15 years [3]	20 – 25 years [3]
Maintenance Costs [A]	Very Low	High	High	Moderate
Affected by High Alkalinity [B]	No	Yes [2,3,4]	Yes – But Less Than Basic Galvanized Steel	No
Affected by Low Hardness [B]	No	Yes [2,3,4]	Yes – But Less Than Basic Galvanized Steel	No
Affected by High Chlorides [C]	No	Yes [3,4]	Yes [3,4]	Yes [5,6,7] – Pitting and/or Cracking
Affected by High Sulfates [C]	No	Yes [3,4]	Yes [3,4]	No
Affected by High Conductivity [C]	No	Yes [3]	Yes [3]	No
Affected by pH – (<6 or >9)	No	Yes [3,4]	Yes [3,4]	No
Affected by High Chlorine	No	Yes [3,4]	Yes [3,4]	Yes [5,6]
Affected by Some Treatment Products	No	Yes [3]	Yes [3]	No
Affected by Airborne Salt and Salt Water	No	Yes [6]	Yes [6]	Yes [6,7]
Affected by Biological (Under Deposit Corrosion)	No	Yes [5,6]	Yes [5,6]	Yes [5,6]
Requires Field White Rust Passivation with Acid or Chemicals [D]	No	Yes [3,4]	Yes [3,4]	No
Susceptible to Chemical Damage, such as Acidic Products	No	Yes [3,4]	Yes [3,4]	Limited
Lowest Initial Cost	No	Yes	No	No
Recommend Quarterly Flush / Rinse	Yes, only for appearance purposes	Yes	Yes	Yes
Recommend Yearly Surface Treatment [E]	No	No	No	Yes [8]

1. CTI – (Structural Design of FRP Components), March, 2010.
2. CSTN – (Metallurgy: Galvanized Steel) – James McDonald, P.E., CWT, February, 2003.
3. Association of Water Technologies (AWT) – (White Rust Prevention - An Industry Update and Guide Paper – 2012).
4. CTI – (Treatment of Galvanized Cooling Towers to Prevent White Rust), June, 1994.
5. CTI – (Materials of Construction for Cooling Towers), October, 2009.
6. CTI Journal – (Living in the Materials World), Frank Morrison, BAC, Winter, 2008 .
7. SPX – Cooling Towers and Salt Water – Thermal Science.
8. Evapco Engineering Bulletin – EB40 – (Maintaining and Cleaning Stainless Steel), July, 2003.

A. White Paper - Maintenance Cost Comparison of Drive Systems.

B. During initial (and possibly subsequent) White Rust Passivation, it may be necessary to control alkalinity with controlled acid feed, (operational cost). Excessive alkalinity or hardness may be treated with ion exchange or membranes in extreme cases, (capital cost).

C. Many anions (Chlorides, Sulfates) can only be removed by treating makeup with membrane or other technology requiring capital investment.

D. White Rust Passivation is required initially, (and periodically in some situations), and typically involves controlling pH between about 7 and 8 for 6-12 weeks, and/or with short or long term inhibitor feed. This represents a cost for acid, pump, pH controller, and additional labor/service time from the water treatment company. (Typically $3-4k per treatment ad).

E. Stainless may be subject to certain stains, deposits, etc., even if not notably corroded. Yearly maintenance may involve cleaning and waxing, representing additional operating costs.