TWIN CSR-CAUSTIC COMPARISON GUIDE
TWIN CSR vs. CAUSTIC SODA vs. CAUSTIC POTASH

Caustics are used for a wide range of industrial applications and as a result are some of the most used commodities in the world. While they are effective pH control and neutralization agents among other uses, they have inherent properties that make them hazardous to health, safety and the environment. Because of this along with increasing regulatory requirements, companies are looking for safer alternatives.

Twin CSR provides comparable abilities to caustic solutions, while reducing hazardous exposure. Twin CSR can be used as a functional replacement for sodium hydroxide and potassium hydroxide to provide an improved health, safety and environmental profile, in addition to operational and cost benefits.

BENEFITS

- Outstanding safety and environmental profile
- 30 minute skin protection
- Low toxicity
- Biodegradable
- Compatible with carbon and stainless-steel alloys
- Linear/controlled pH adjustment
- Product offerings with -40°F/-40°C freeze point
- Compatible with most surfactant systems
- Suppresses calcium and magnesium precipitation in hard water

With the increased focus on key performance indicators (KPIs) related to environmental, social and corporate governance (ESG), sustainability and safety, industry is looking to new technology to improve efficiency, cost, safety and environmental factors. The following tables provide the benefits of CSR technology in these areas compared to standard commodity caustics.

Table 1. HSE properties of CSR and common caustic solutions.

	CSR	Sodium Hydroxide (NaOH) Solution	Potassium Hydroxide (KOH) Solution
TDG* (Canada)	UN1824 Class 8 PG II	UN1824 Class 8 PG II	UN1814 Class 8 PG II
TDG (USA)	UN1824 Class 8 PG II	UN1824 Class 8 PG II	UN1814 Class 8 PG II
Skin Corrosion (OECD 404)	Skin Irritant (2)	Corrosive (1)	Corrosive (1)
Eye Damage / Irritation	Eye Damage (1)	Eye Damage (1)	Eye Damage (1)

*Transportation of Dangerous Goods

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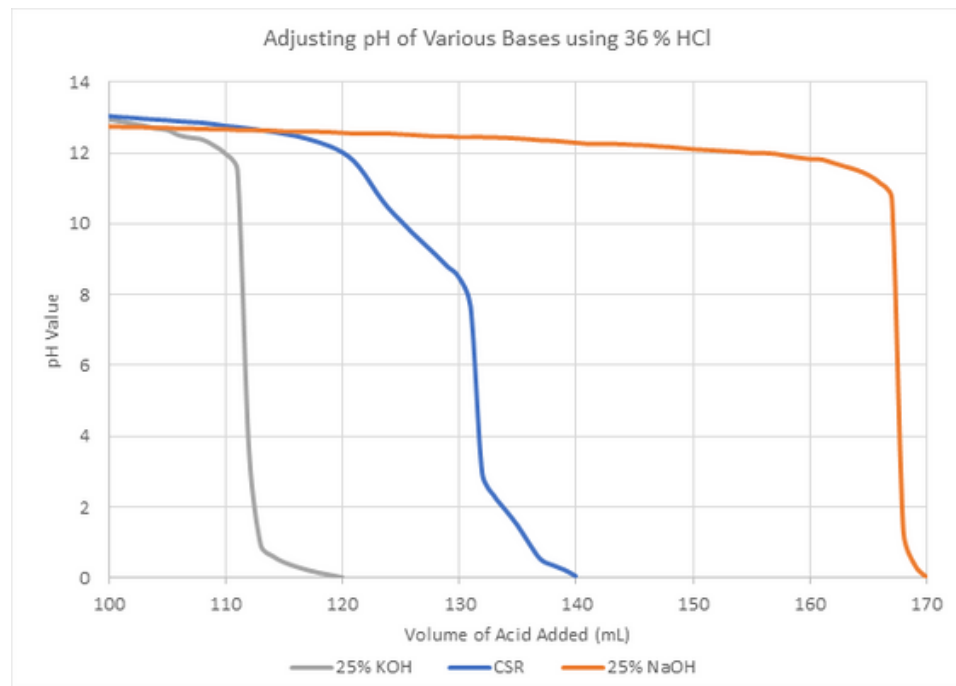## TWIN CSR vs. CAUSTIC SODA vs. CAUSTIC POTASH

FREEZE POINT

Twin CSR provides an additional benefit over commodity caustic solutions by having a lower freeze point, improving transportation and storage logistics.

Table 2. Freeze point of CSR compared to traditional caustics.

Caustic Solution	Freeze Point (°F/°C)
CSR Concentrate	- 40 / - 40
25% NaOH	0 / -18
45% KOH	- 22 / - 30

PH ADJUSTMENT

Twin CSR can be used in pH adjustment applications and provides a significant benefit over other commodity caustics because the reaction is controlled due to the modified nature of CSR, as shown below. Twin CSR gives comparable pH control to a 25% caustic solution, but approximately 20% less volume of CSR is required to neutralize the acid with sodium hydroxide (NaOH) when the two products are compared side by side.

Adjusting pH of Various Bases using 36 % HCl

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