Aggregates in Concrete

Aggregate sources contain small amounts of deleterious substances that can create blemishes in the finished surface of Portland cement concrete. Acceptable standards by the Iowa Department of Transportation (DOT) require sources to have less than 2% deleterious material for structural concrete and 3% for nonstructural concrete. Approved Iowa DOT Aggregate Sources are listed in their Materials IM T203 General Aggregate Source Information. ASTM C33 Standard Specification for Concrete Aggregates has provisions to specify lower limits for deleterious substances specifically in Table 2 Limits for Deleterious Substances in Fine Aggregate for Concrete and Table 4 Limits for Deleterious Substances and Physical Property Requirements of Coarse Aggregate for Concrete.

No aggregate source can be guaranteed to be 100% free of all deleterious substances and the resulting incidences of staining, popouts, and other surface blemishes. The concrete contractor also plays a very important role in reducing the amount of surface issues by limiting the amount of water added to the concrete mix, using proper finishing techniques, and curing (especially wet curing or rinsing of the concrete surface) the concrete which have a large influence on the final product. For more information on popouts, reference National Ready Mix Concrete Association (NRMCA) CIP 40 Aggregate Popouts

References:

- https://iowadot.gov/Construction_Materials/materialsforms/T203.pdf
- https://www.astm.org/Standards/C33
- https://www.nrmca.org/wp-content/uploads/2021/01/40pr.pdf