

## **Boron Modified Active Belite Cement**

### **Objective**

- Produce long term high strength cements.
- Decrease fuel energy by producing boron cement clinker with low temperature in energy intensive cement industry.
- Decrease CO<sub>2</sub> emissions by using of low lime sources without any extra investment.
- Increase of usage of boron waste and/or low grade boron ores.

### **Works**

- Analyse of raw materials and find optimum parameters for producing boron cement clinker at TÜRKÇİMENTO R&D Institute.
- Industrial scale production after finding optimized parameters in lab scale experiments.

### **Results**

- Lower electric energy consumption by using of colemanite ore in raw materials' grinding.
- Energy conservation with usage of lower amount fuel in rotary kiln.
- Higher liter weight clinker production due to using lower amount of coal in rotary kiln. Lower dust clinker production in rotary kiln. Higher work index of clinker because of denser structure.
- Lower early strength (2-7 days) than Portland Cement (PC).
- Higher strength (28 days) than PC.
- Boron cement, classified as Very Low Heat Cement.
- Lower shrinkage than PC.

### **Potential Areas Of Usage**

- Mass concrete in dam building
- Concrete road especially roller compacted concrete
- Viaduct, dock, industrial ground concrete
- Oil-wells
- Nuclear plants (as radiation shield)

