



**Table 1 — CSR - TDE-BOF™ Implementation Levels**

TDE-BOF™ can be deployed at three progressive implementation levels, depending on the customer’s objectives, available data and desired degree of plant integration.

**Integration level:**

● Full live integration ◐ Partial / advisory integration — No live plant connection required

Version	Main purpose	Typical use	Plant integration	Expected output
<b>Offline Simulator</b>	Process study and scenario evaluation	What-if analysis, recipe comparison, endpoint strategy review, slag practice assessment, refractory wear interpretation, training, benchmarking, engineering studies	— No live plant connection required	Simulated process trends, thermal and metallurgical analysis, comparison of operating scenarios, preliminary converter lining-related interpretation
<b>DSS / Advisory Mode</b>	Decision support during plant operation	Operator guidance, endpoint support, blow assessment, slag and thermal load interpretation, refractory consumption review, deviation interpretation, process review	◐ Historical, exported or semi-live plant data	Recommendations, warnings, process interpretation, support for operational decisions, refractory-related advisory support where data quality is sufficient
<b>Online Digital Twin</b>	Real-time synchronized process representation	Live monitoring, advanced supervision, predictive support, digital twin deployment	● Integrated with live plant signals and automation architecture	Real-time tracking, predicted process evolution, dynamic advisory output, synchronized digital process view, converter lining condition support

Each level corresponds to a different operational scope, from offline engineering analysis to real-time synchronized process intelligence.