Table 2 — Customer Data Requirements for CSR - TDE-BOF™

What information is required from the customer?
The implementation level depends on the quality, depth and availability of plant data. The matrix below shows what is typically needed for each TDE-BOF™ deployment level.

Legend:
● Required ◐ Recommended ○ Optional — Not required

Required input from customer	Offline Simulator	DSS / Advisory Mode	Online Digital Twin
Basic BOF plant data (converter size, nominal heat size, route description, main equipment)	●	●	●
General BOF process description (charge practice, blowing logic, flux practice, target grades)	●	●	●
Typical operating values (hot metal temperature, hot metal chemistry, scrap ratio, oxygen consumption, endpoint targets)	●	●	●
Standard recipes / operating practice	●	●	●
Historical heat results (final temperature, final chemistry, oxygen used, additions, tap results)	◐	●	●
Heat-by-heat production data	○	●	●
Time-stamped process sequence (blow start/end, additions, measurements, sampling events)	○	◐	●
Actual process measurements during operation	○	●	●
Off-gas data (if available)	○	◐	●
Sublance or in-process temperature / sampling data (if available)	○	◐	●
Converter refractory design data (lining zoning, material grades, nominal thickness by area)	◐	◐	●
Refractory campaign history and vessel relining records	○	◐	●
Gunning / repair records and end-of-campaign observations (if available)	○	◐	●
Shell temperature / hot spot history (if available)	○	◐	●
Slag chemistry history relevant to refractory attack and slopping behavior (if available)	○	◐	●

Required input from customer	Offline Simulator	DSS / Advisory Mode	Online Digital Twin
List of available data sources (Excel, CSV, historian, database, Level 2, etc.)	◐	●	●
Live signal availability	—	○	●
PLC / Level 1 / Level 2 tag list	—	○	●
Tag description and engineering units	—	○	●
Data communication architecture (OPC-UA, database, API, historian, network constraints)	—	◐	●
Automation sequence and phase logic	—	○	●
IT / OT environment and deployment constraints	—	○	●
Customer expectations and project objectives	●	●	●

TDE-BOF™ can start as an Offline Simulator and progressively evolve into DSS / Advisory Mode and a fully integrated Online Digital Twin as plant data availability increases.

Note on data quality and consistency

The quality of TDE™ outputs depends on the accuracy, completeness, time alignment and engineering consistency of the data provided by the customer. Whenever available, data should be supplied with clear units, time stamps, signal descriptions, process phase references and indication of measurement source. Inaccurate, incomplete or non-synchronized data may still allow a preliminary implementation, but with reduced predictive strength and advisory precision.

Note on refractory-related analyses

Refractory optimization, lining wear interpretation, campaign life support and slag/refractory interaction assessment can be significantly improved when the customer provides refractory design data, lining zoning, material grades, campaign history, repair records, shell temperature information, hot spot history and refractory consumption records.