



SWABO, Singapore



Key Facts of The Project

- Location: Sakra, Jurong Island, Singapore
- Type of the Field: Waste-to-Energy (WtE)
- Owner: Sembcorp Ltd.
- Ferbeck's Client: Hyundai-HEC 
- Ferbeck's Scope of Work Completion: 2016



sembcorp
Waste-to-Energy (WtE) Plant

2 × 80 m
Stack height

2.0 m
Stack diameter

2×575 t/d
Waste capacity

80 MWth
Steam output

EPC Halla Energy & Environment and Hyundai-HEC Joint Venture constructed a new Energy-from-Waste (EfW) facility at Sakra, Jurong Island, Singapore for Sembcorp Ltd. The plant processes 2 × 575 tonnes of waste per day at 12 MJ/kg calorific value, generating 80 MWth of steam at 400°C distributed to multiple local industries.



Ferbeck's Scope of Work

Engineering, prefabrication and erection of stacks

- Structural design of 2 x 80 m steel stacks
- Foundation block and anchorage design
- Manufacturing - outer shell & inner liner
- Transportation to Sakra, Singapore
- Erection of both stacks on site

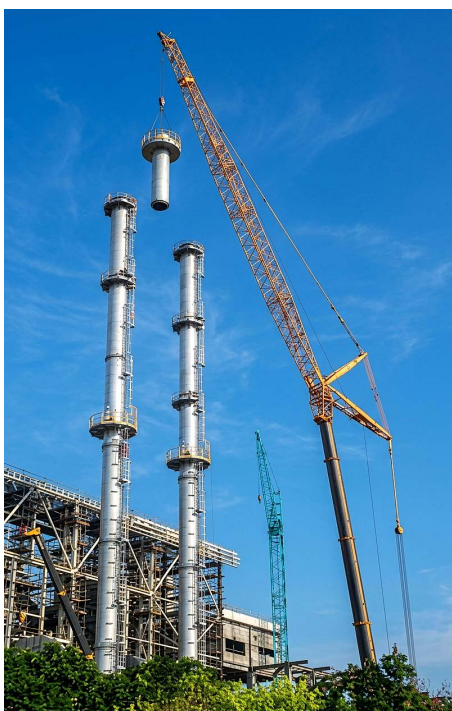


Key Facts of The Steel Stack

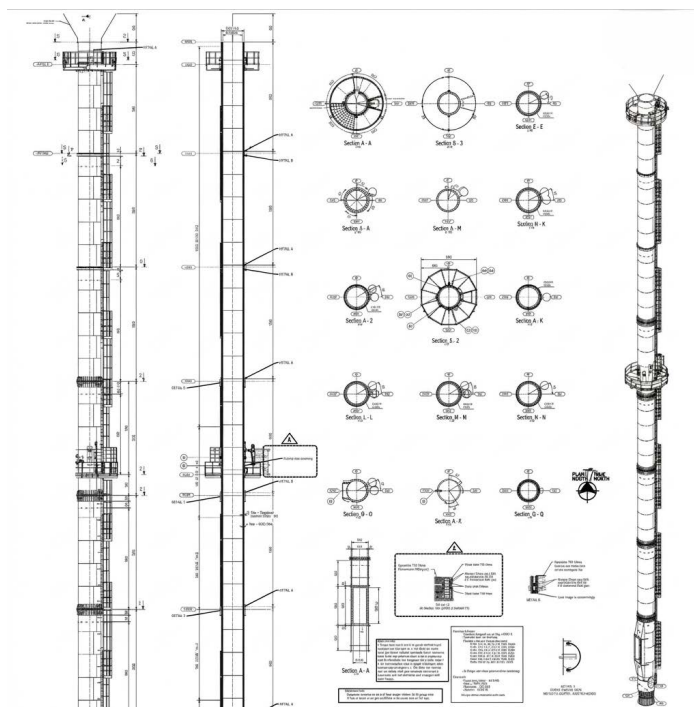
- 2 Double Skin Steel Stack
- Height: 80 m
- Inner Liner: Stainless Steel
- Liner diameter: 2000 mm
- Flue Gas Temperature: 160 °C



80 m Steel Stacks - Design & Technical Specification



80 m stacks during erection - Sakra site



General Arrangement Drawing - Stack GA, sections & damper detail / Scale 1:75

Stack Technical Specifications

Stack type	Double-skin self-supporting steel stack
Total height	80 m
Outer diameter	2.0 m
Inner liner	Stainlesssteel, mineral wool insulation
Access system	External ladder with safety hoops
Platforms	1× circular platform + 1× top damper platform per stack
Design code	British Standards + Eurocodes (BS/EN)
Vibration control	Top-mounted TMDs – specified & sized by Ferbeck
Installation	Segment-by-segment sequential delivery & erection

Design validated against BS EN 13084 and relevant Eurocode load combinations. Both stacks are identical — fully interchangeable.





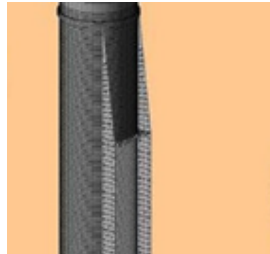
Structural Engineering & Manufacturing

In-house Structural Design

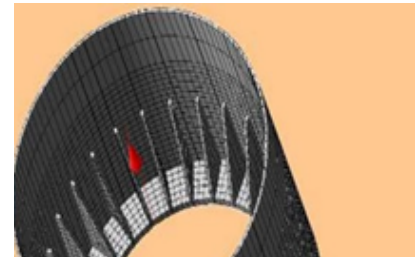
All stacks were designed entirely in-house by Ferbeck International's engineering team, complying with British Standards and Eurocodes. Design scope included full structural analysis, wind loading, vortex-induced vibration assessment, and TMD specification.



Structural FEA & wind loading analysis



Stack FE model



FEM shell ring - liner connection detail

Vibration dampers (TMDs) designed and sized by Ferbeck — one per stack, installed at top section.

Manufacturing

Manufacturing was carried out at the highest technical specifications. The outer shell and inner stainless-steel liner were fabricated in parallel. Anchor bolt assemblies were precision-machined for direct insertion into the concrete foundation blocks before stack erection.



Anchorage ring fabrication



Outer shell & inner liner sections



Stack elements ready for shipment

- Outer shell sections rolled, welded and painted to spec
- Stainless steel inner liner fabricated with mineral wool insulation fill
- Anchor bolt assemblies machined for concrete foundation insertion
- Full pre-shipment dimensional QA - all elements cleared and staged for sea freight





Erection on Site

Execution

The Sakra site presented significant logistical constraints. Insufficient laydown space meant stack segments had to be delivered sequentially and erected immediately upon arrival - zero buffer for re-sequencing. Coordination across multiple active contractors was critical. Ferbeck International managed the complete installation without a single co-activity clash.



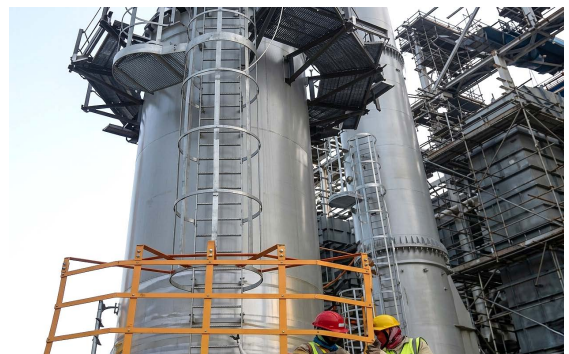
Stacks under erection - complex site constraints



Completed stacks - view at the end of erection



Top-mounted TMD installation



Platform installation at prescribed elevation

Erection Scope

Foundation anchorage	Anchorage bolt sets installed and verified in concrete foundation blocks prior to stack erection
Sequential delivery	Stack segments delivered one-by-one and erected immediately – constrained site, zero buffer
Platform installation	Circular access platforms installed at designated elevation during erection sequence
TMD commissioning	Top-mounted vibration dampers installed and commissioned at final upper segments
Crane operations	500 T main lifting crane + 25 T tail crane – tandem operation for heavy lifts
Completion	Both 80 m stacks fully erected – on schedule, zero co-activity incidents

