

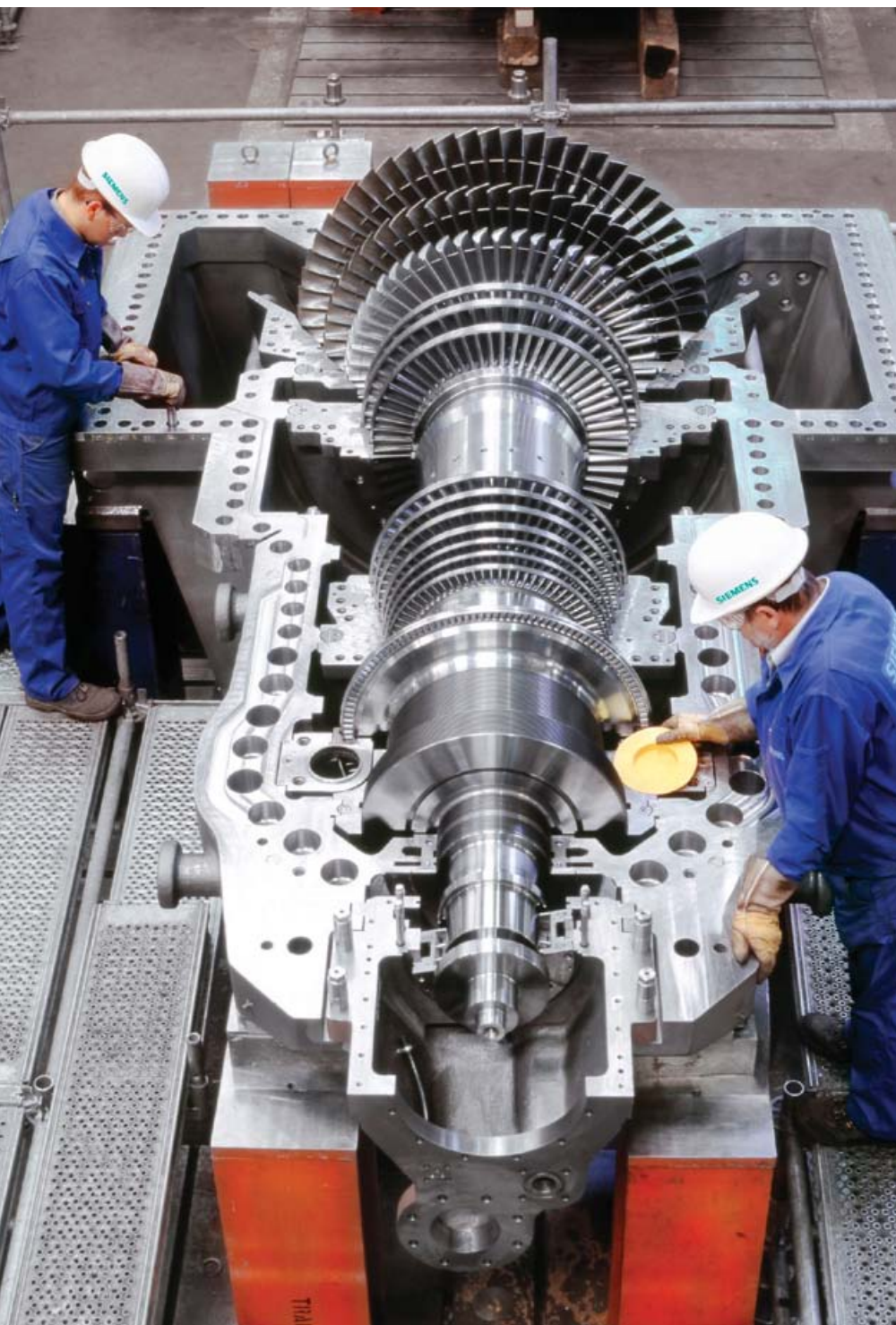


## Integrated intralogistics solution

Versatile materials handling on three levels for turbine production

Siemens AG, Energy Sector, Görlitz location

## More than 100 years of expertise in turbine production



### Siemens steam turbines

As a world leader in the manufacture of industrial steam turbines, Siemens offers a comprehensive and versatile range of products. With more than 100 years of experience in the production of steam turbines as well as the continuous further development of this technology, Siemens has a reputation as a trusted partner for power generation in the 45 kW to 1,200 MW output range.

Of the more than 400,000 employees who work for Siemens AG, some 85,000 work in the Energy sector all over the world – 950 of whom at the location in Görlitz. At this, the longest established of seven locations worldwide, industrial steam turbines have been in production since 1910. The plant in Görlitz has specialised in the manufacture of industrial steam turbines with an output of up to 250 MW. These turbines are mainly used to generate power in combined heat and power plants, cogeneration plants or smaller gas and steam turbine facilities. In addition, these types of turbines are also employed to recover energy in sugar and pulp factories, in the chemical industry as well as in solar power plants.

### Capacities for growing global energy demand

To meet rising demand for turbines, EUR 8 million has been invested at the location in Görlitz. However, the assembly bay was not only designed to extend the existing capacities by a further bay with new machine tools. To achieve more efficient processes with an increase in production, the new assembly bay was tailored to meet the needs of the manufacture of industrial steam turbines with an output of up to 250 MW.

The concept: Each turbine is assigned to a fixed assembly station from the first to the last step in assembly. Implementation of this concept places demanding requirements on the intralogistics system.

### Overhead material flow

- Optimum utilisation of the floor space
- Cost reduction by eliminating unnecessary travel paths
- High availability and just-in-time delivery to the assembly stations
- Accelerated processes that incorporate ergonomic requirements

### Autonomous assembly stations

- Each of the 20 assembly stations operates largely independently
- Parallel to this, crane installations have to handle heavy loads, serve the workplaces and handle parts during assembly.

### Precise handling

- Gentle, safe and reliable handling of large and heavy components as well as complete turbine packages

### 180° turn

- For a special operating step, the turbine housings have to be turned 180° at the assembly station



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## Productivity raised to a new level

With crane installations that are specially designed to meet requirements for heavy lifting, workplace logistics and handling parts during assembly, Siemens and Demag Cranes & Components have raised industrial turbine production to a new level. To be precise, to three new levels.

Already during the project phase, the new crane installations were confronted with the first logistics challenge. The new building, commissioning and all of the interior work including installation of the Demag crane systems had to be completed within a period of just nine months. This was a tight time frame in which Demag Cranes & Components offered the optimum solution: an integrated intralogistics concept from a single source. From assembly to the parts delivery operation and heavy-load handling, Demag crane installations provide an overhead material flow solution on three levels to each of the 20 assembly stations.

### Process crane level

Two process cranes that are individually tailored to meet the needs of the

specific application are each fitted with two rope hoists provide for process reliability as well as maximum safety and availability on the upper crane level. Individual components such as base frames, turbine housings and fully assembled rotors that weigh between 40 and 70 t are handled by the process crane, which has a rated load capacity of 80/32 t. The second process crane, which has a capacity of 200/100 t, is responsible for transporting turbine packages weighing up to 190 t to the goods-out area when they are ready for shipping. This process crane also performs further functions:

1. Safe turning. An important step in production requires the turbine housings to be turned 180° into the opposite assembly position. In the past, this operation was performed with the help of a mobile crane. In future, the process crane will complete this task quickly and efficiently.
2. Exact weighing. Load detector devices are integrated into the bottom blocks. By means of summation functions, any deviations from the expected weight can be detected

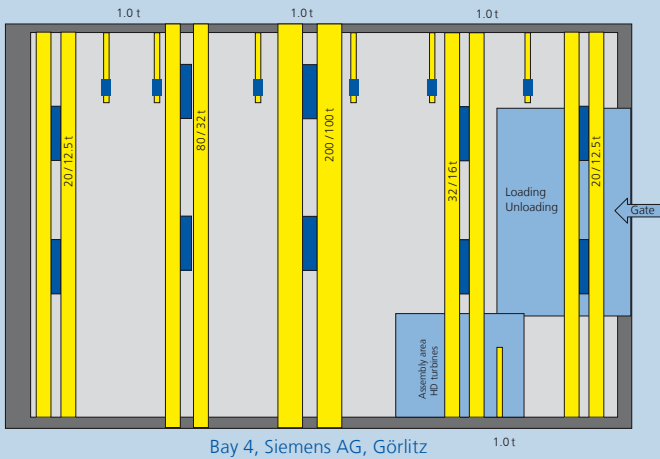
early on, thus enabling the previously issued travel permit to be updated, if required.

### Supply level

Three standard overhead travelling cranes of double-girder design with load capacities of 20/12.5 t and 32/16 t are used to replenish the 20 assembly stations with parts to be fitted. The cranes are fitted with radio controls and particularly compact DR-Pro travelling rope hoists, which enable valuable additional lifting height to be achieved.

### Assembly level

Wall-mounted slewing jibs at the assembly stations complete the overhead material flow system. Since the slewing jib cranes are fitted to the building columns, they save valuable space and assist the workers with optimum handling for assembly of parts that weigh up to 1,000 kg. The 5 m-long jibs can be manually slewed through 180° and are fitted with DC-Pro travelling chain hoists, which can be conveniently operated by means of DST control pendant switches.



### Achieving demanding targets

More turbines. Greater reliability. Improved production efficiency. The integrated intralogistics solution provided by Demag Cranes & Components helps Siemens at its Görlitz location to achieve its targets in terms of

- process improvement,
- cost reduction,
- availability,
- supply reliability
- and delivery performance.

### Greater sensitivity for precise control

Exact positioning of heavy loads is the key to safe and efficient production. The two process cranes meet this requirement with maximum precision. Inverter-controlled speeds and load-dependent speed control of the lifting motion facilitate precise handling and exact positioning – right down to the last millimetre.



### Simplifying processes

The shrink-fitting of so-called live steam inserts requires parts of the turbines to be turned 180° into the opposite assembly position. In the past, this operation was performed with a mobile crane. With the new process crane, the turning operation can be carried out easier, faster and without the need for any additional space. Two crabs that are designed for safely turning the workpieces reliably hold the turbine parts in any position.

### More useful space

The entire overhead material flow system utilises the available building space to the full. Particularly effective are the wall-mounted slewing jib cranes, which support the workers in the pre-assembly of sub-assemblies. Since they are mounted on columns in the building, the wall-mounted slewing jib cranes do not take up any floor space and, therefore, save valuable space that can be used for the assembly work.



# Technical data

	Overhead travelling cranes (level 1, at a height of 16.0 m)		Overhead travelling cranes (level 2, at a height of 10.0 m)		Wall-mounted slewing jibs	
Rope hoists	200/100t		80/32t		32/16t	
					20/12.5t	
Operating speeds						
Long travel		0–40m/min		0–40m/min	3–40m/min	3–40m/min
Cross travel		0–20m/min		0–20m/min	5–25m/min	5–25m/min
Main lifting						
Full load		0–2.1m/min		0–2.7m/min	0.3–5.3m/min	0.5–5m/min
Partial load	up to 112 t	0–3.3m/min	up to 46t	0–4.4m/min		
Auxiliary lifting						
Full load		0–3.1m/min		0–5.4m/min	0.3–8m/min	0.5–8m/min
Partial load	up to 59t	0–5.0m/min	up to 18 t	0–8.8m/min		
Crane span						
		24.0m			23.1 m	

Wall-mounted slewing jibs	
Jib	5 m
Slewing radius	180°
Hoist unit	DC-Pro chain hoist 1,000 kg

## Further reference installations



Heavy-load workshop with three crane levels at SMS Meer in Mönchengladbach



Equipment used in an assembly bay for offshore power stations at REpower in Bremerhaven



Siemens in Mülheim: Process cranes with turning function for the production of large turbines



Standard and process cranes for the production of large-volume metal superstructures at Donges in Darmstadt

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