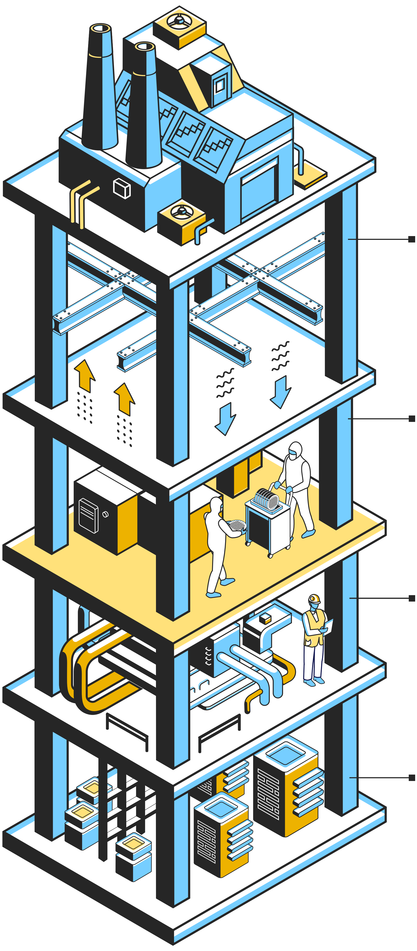
What does it take to build a fab?

An Intel semiconductor factory, or "fab," is a manufacturing marvel. Every hour, every day of the year, the 70-foot-tall structure produces millions of computer chips, the most complex products on Earth and each not much bigger than a fingernail. A fab — which includes 1,200 multimillion-dollar tools and 1,500 pieces of utility equipment — takes about three to four years, over $10 billion and 7,000 construction workers to complete. Three of the fab's four levels support the clean room level, the place where actual chip production occurs.



1. Interstitial and fan deck (top level)

The fan deck houses systems that keep the air in the clean room particle-free and precisely maintained at the right temperature and humidity for production. The interstitial is the tallest level of the fab.

2. Clean room level

A clean room is made up of more than 1,200 factory tools that take pizza-size silicon wafers and eventually turn them into hundreds of computer chips. Clean room workers wear bunny suits to keep lint, hair and skin flakes off the wafers.

Fun Fact: Clean rooms are usually lit with yellow lights, necessary in photolithography to prevent unwanted exposure of photoresist to light of shorter wavelengths.

3. Clean subfab level

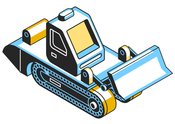
The clean subfab contains thousands of pumps, transformers, power cabinets and other systems that support the clean room. Large pipes called "laterals" carry gases, liquids, waste and exhaust to and from production tools. Workers don't wear bunny suits here, but they do wear hard hats, safety glasses, gloves and shoe covers.

4. Utility level

Electrical panels that support the fab are located here, along with the "mains" — large utility pipes and ductwork that feed up to the lateral pipes in the clean subfab. Also here are chiller and compressor systems. Workers who monitor the equipment on this level wear street clothes, hard hats and safety glasses.

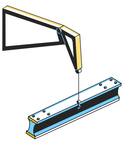
What it typically takes to build a pair of leading-edge fabs

The heaviest cargo are chillers at 55 Tons. That is equivalent to 12 average-size African male elephants.



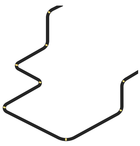
More than 2M cubic yards of soil and rock will be dug up and reused on site. That is enough to fill The Ohio State University football stadium.

500K cubic meters of concrete will be poured, plus 100K tons of steel reinforcement. That represents more than 2X as much used to build the Burj Khalifa in Dubai, the world's tallest building.



58K tons of structural steel will be erected. That is 8X the weight of the Eiffel Tower.

The 7K on-site tradespeople are expected to surpass 15M hours. That adds up to more than 1,700 calendar years.



23M feet of cable will be installed. That is the distance equal to 166 full marathons.

Fabs by the numbers

Intel has fabs in Arizona, Oregon, New Mexico, Ireland and Israel with plans for new fabs in Ohio and Germany. Each fab is at least 250k square feet. Four American football fields could fit inside each fab's clean room.