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. With many comparable in size to a fingernail, the chips are the most complex products on Earth. A fab — which includes 1,200 multimillion-dollar tools and 1,500 pieces of utility equipment — takes about three years, $10 billion and 60,000 construction workers to complete. Three of the fab’s four levels support the clean room, the only 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 free of dust and particles and maintain 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 polycrystalline silicon wafers and eventually turn them into hundreds of computer chips. Clean-room workers wear bunny suits to keep lint, hair and skin particles off the wafers.

3. Clean subfab level
   The clean subfab contains thousands of pumps, transformers, power cables, and other systems that support the clean room. A large air handling system called a “scrubbers” carry gases, liquids, waste, and exhaust to and from production tools. Workers don’t wear bunny suits here, but they do wear hair nets, safety glasses, and shoe covers.

4. Utility level
   Electrical panels that supply the fab are located here, along with the “scrubbers” — large utility pipes and ducts that lead to the intake pipes in the clean subfab. Here, too, are chillers and compressor systems. Workers who monitor the equipment on this level wear street clothes, hard hats and safety glasses.

Fabs by the numbers

Intel has fabs in Oregon, Arizona, Ireland and Israel. Each fab is at least 250,000 square feet.

4 American football fields could fit inside the clean room.

Here are some examples of what it will take to complete one factory in Ireland.

The heaviest delivery included chillers at 50,000 kilograms. That is equivalent to 12 average-size African male elephants.

The 5K on-site tradespeople recently surpassed 11,255 hours. That adds up to more than 1,255 calendar years.

600K cubic meters of concrete will be poured plus 75K tons of steel reinforcement. This represents 2x as much steel as would fill the Burj Khalifa in Dubai, the world’s tallest building.

35K tons of structural steel will be erected. That is 5x the weight of the Eiffel Tower.

3M cubic meters of soil and rock will be removed. That is the equivalent of 400 Olympic-size swimming pools.

9M meters of cable will be installed. That is the distance equal to 214 full marathons.

*Note: Calculations made in metric tonnes, but the figures are for representation of the comparison and not substituting. Other values and units are in the context of the units used.*