Single Emitter Pump Diodes - Our Reliable Pump Source
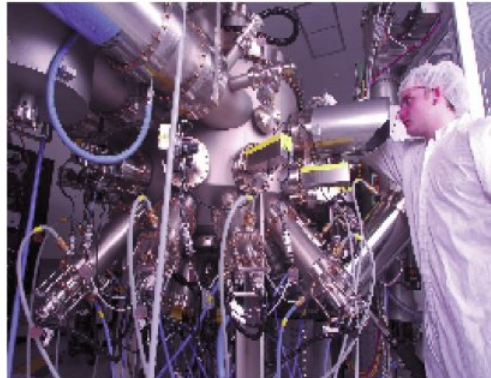
Latest generation MBE reactor for diode wafers growth

IPG uses molecular beam epitaxy to grow indium gallium aluminum arsenide structures. This method yields excellent optoelectronic material quality and is the preferred method when low-defect density and uniformity of opto-electronics parameters across large deposition areas are required. In addition, IPG has developed over 20 proprietary processes for epitaxial growth, front-end processing, facet coating, assembly, test and burn-in in order to create a high level of brightness and a high power reliable semiconductor diode chip. IPG produces all of our diodes in our own facilities utilizing highly automated manufacturing including automated wafer inspection, die attach, wire bond and other test and assembly equipments.

Another critical operation for IPG is diode packaging, in which light emission from single emitter diodes is launched into an optical fiber. Characteristics such as the ability of the package to dissipate heat produced by the semiconductor diode and withstand vibration, shock, high temperature, humidity and other harsh environmental conditions, are critical to the reliability and efficiency of our products. Our proprietary packaging techniques based on customized automated equipment and processes have enabled us to become the world largest manufacturer of pump diodes for industrial applications.
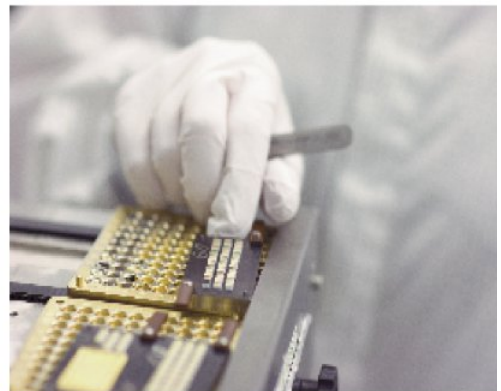
Individual single emitter diode chips

IPG Photonics diode testing facilities

Our ownership of the entire innovation and supply chain sets IPG apart as the only company that controls the performance, cost and yield of both active fibers and semiconductor pump diodes - the most crucial components of the laser/amplifier product ecosystem. And as a rule, IPG components, including other key optical parts that are optimized for our high performance lasers and amplifiers, are only available in IPG laser and amplifier systems. Our diodes are tested or burned-in for hundreds of hours on accelerated stress tests and, in the end, we only use the best of them that have passed our stringent control standards.