

# DIAMOND REDEFINES THE 0.1dB CLASS!

Diamond has always set new standards for optical connector performance, and is now doing it again: In the future, measured concentricity and tilt angle will be our main criteria for granting superior optical performance 0.1dB First Class connectors.



## Your benefit from this decision – Guaranteed Performances!

The optical performance of a connector can only be guaranteed by controlling several parameters such as:

- ▶ Ferrule diameter, form and hole concentricity
- ▶ Polishing parameters
- ▶ End face imperfections: scratches, pits and contamination
- ▶ Insertion loss, Return Loss etc.

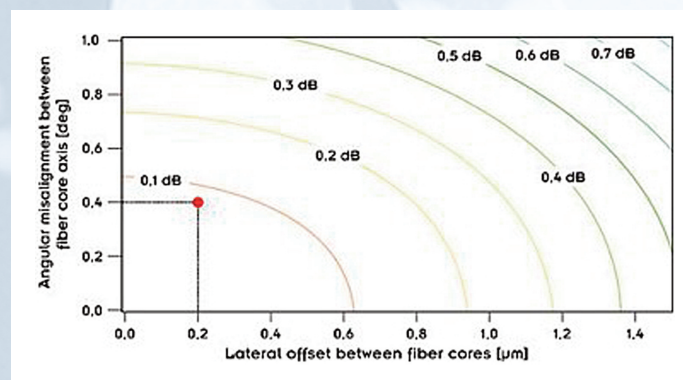
which have to be monitored during the relevant step of the manufacturing and assembly process.

The result of an IL-measurement is highly influenced by major measurement uncertainties (reference connector and adapters, fiber tolerances (MFD), uncertainties related to the measurement instrument) and cannot therefore be used as the unique criteria for the definition of performance grades for optical connectors.

The worldwide accepted IEC-61755 Standard series "Fiber optic connector optical interface" describes performance grades for connectors terminated on SM-fibers. These standard series define a set of prescribed conditions which must be maintained in order to satisfy certain requirements for the attenuation and return loss performance in a randomly mated pair of fibres. If physical contact between the fibers is guaranteed, the most significant parameters affecting attenuation are, lateral offset and angular misalignment.

By maintaining specified limits on these parameters, the performance of the different classes can be guaranteed when connectors are randomly mated.

## RESULTING IL LEVEL CURVES

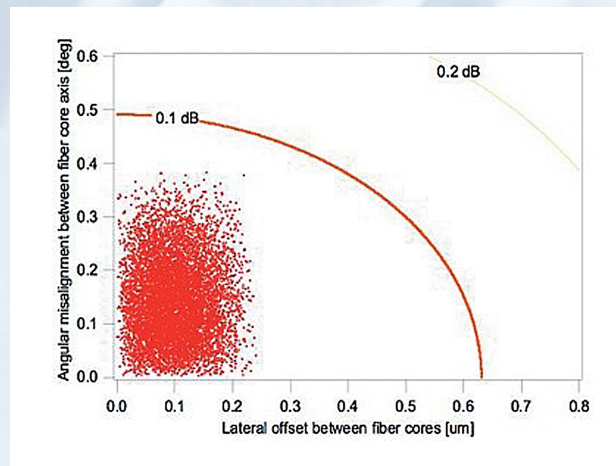


The above figure shows resulting IL niveau curves of optical connections of SM fibers. The red spot in this graph indicates a connection, where the lateral offset between the 2 fiber cores is  $0,2\mu\text{m}$  and the overall fibre misalignment is 0,4 degree, resulting in an IL-value below 0.1 dB.

DIAMOND has always developed and produced fiber optical connectors according to these principles. The parameters eccentricity and tilt angle of our connectors are rigorously taken under control and measured at 100% during the termination process, and all the stringent parameters of each connector we produce are also recorded.

By insuring that each parameter is controlled during termination (fiber eccentricity  $< 0,125\mu\text{m}$  and tilt angle  $< 0,4^\circ$ ) the "0.1 dB class" can be guaranteed for randomly mated connectors.

## SIMULATED RESULTS OF THE DIAMOND 0,1-DB FIRST CLASS CONNECTORS



Simulated results of the "0,1-dB First Class" connectors:

- ▶ 10.000 connectors with "0,1-dB class" tolerances were mated numerically, the resulting fiber cores lateral offsets and angular misalignments were calculated, illustrated with red spots in the above graph (Monte-Carlo-Simulation).
- ▶ To be noted that all IL calculated values are located below the 0.1 dB niveau curve!

### Summary:

**By controlling the tolerances on fiber core eccentricity and angular misalignment, Diamond is able to define an optical performance grade, with guaranteed random mated attenuation within "0.1dB first class".**