

How our process evaluations impact customer experiences

The Taguchi Loss Function focuses on reducing variation and striving for a process mean that is “on target”. On the other hand, tight tolerances focus on conformance to specifications, which may not lead to quality improvements, but simply to categorization of results as good or bad. Here we compare and contrast the Taguchi Loss Function with tight tolerances (specifications) on the dimensions of quality, cost, repeatability, reliability, down-stream effects, and interactions with other parts and processes:

Dimension	Taguchi Loss Function (reduce variation)	Tight Tolerances (Specifications)
Quality	Emphasizes reducing variation and striving for a process mean that equates to the nominal specification, leading to higher and more consistent quality	Focuses on meeting specifications, which may not necessarily improve quality. Does not address the underlying variation in the process, instead
Cost	Reducing variation leads to cost savings by minimizing scrap, rework, warranty claims and decreasing dependence upon inspection.	Tightening tolerances can lead to increased manufacturing and assembly costs, as it may require more precise machining and inspection
Repeatability	The Taguchi Loss Function helps to ensure consistent process outputs by focusing on reducing variation	Tight tolerances may not necessarily improve repeatability, as they do not address the underlying variation in the process
Reliability	Reducing variation can lead to more reliable products, as the process mean is closer to the design’s nominal specification. Parts and processes “fit” better	Tight tolerances may not necessarily improve reliability, as they do not address the underlying variation in the process. Tolerance stack-up is common.
Down-stream effects	Reducing variation improves fit between part and process element and reduces down-stream problems, such as scrap, rework, and warranty claims	Tight tolerances may lead to increased down-stream effects, such as tolerance stack-up, higher scrap rates, rework and product warranty claims.
Interactions with other parts and processes	The Taguchi methods consider the interactions between parts and processes by focusing on reducing variation during the design process	Tight tolerances may not necessarily consider the interactions between parts and processes, as they do not address the underlying variation that is designed into parts and processes.