

Design Intent Dimensions

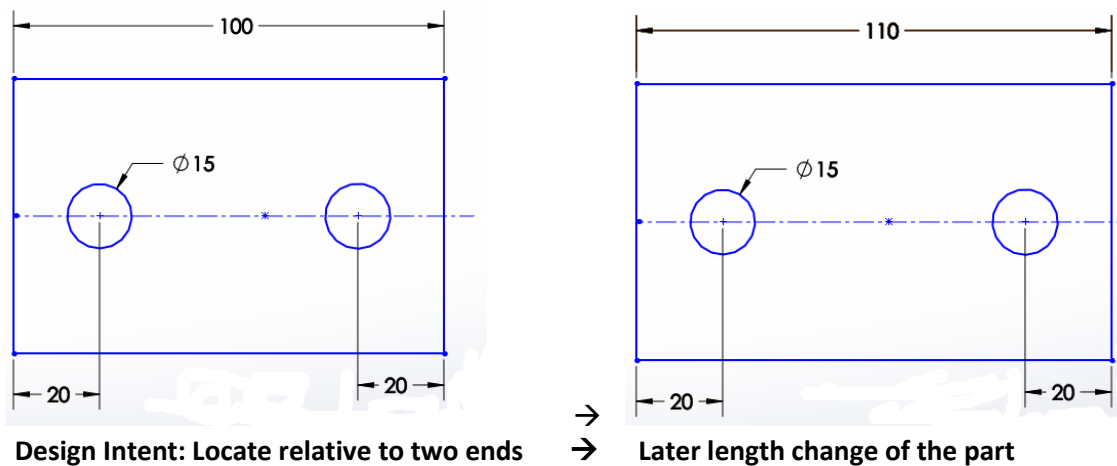
(The proper way to dimension your solid parts)

When comparing parts or assemblies of parts it is important to try to understand the intentions of the original designer. For hundreds of years that information existed only as dimensions shown in multiple two-dimensional drawings. Today, the “design intent” dimensions will exist within a computer solid model as the dimensions utilized to create some new feature of a part. It is possible to build parts from a computer solid model without every producing two-dimensional drawings with dimensions. However, since such drawings are common and have many uses a computer solid modeling system can produce such drawings at the push of a button.

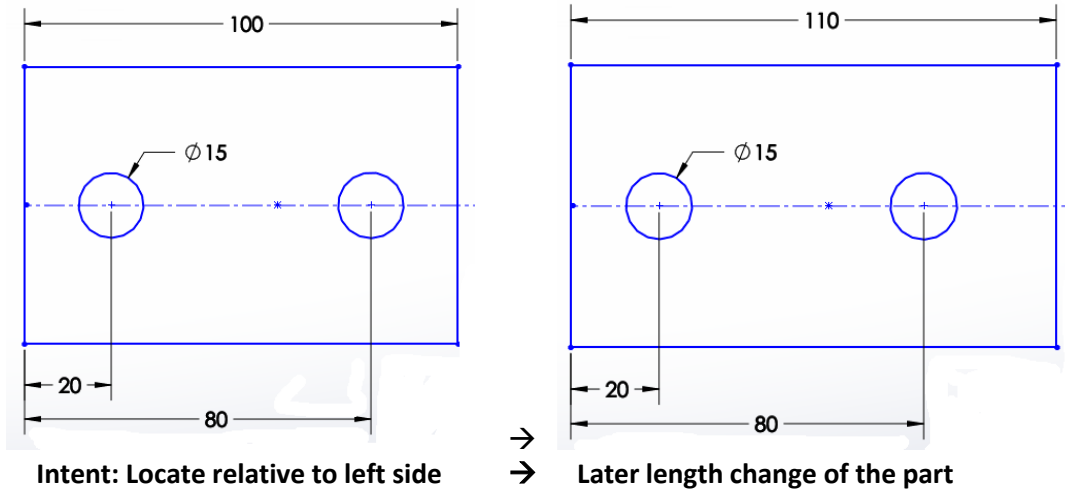
However, while the automatic creations of drawings always are correct, they frequently do not clearly show the “design intent” construction of the original designer. Often dimensions in such drawings are added after the original design by a person that selects some other sets of dimensions. Incorrect choices for dimension displays will be correct but often do not provide enough information to actually build a part using only the drawings.

If a part meets the design intentions of the original designer, but displays a different dimensioning style then that is strong technical evidence of copying (reverse engineering) that part. Likewise, if a secondary feature, or an optional feature, of an existing part has almost identical dimensions to the original design intent dimensions then those dimensions are also evidence of a part being copied. Here the important concepts of “design intent” dimensions are summarized.

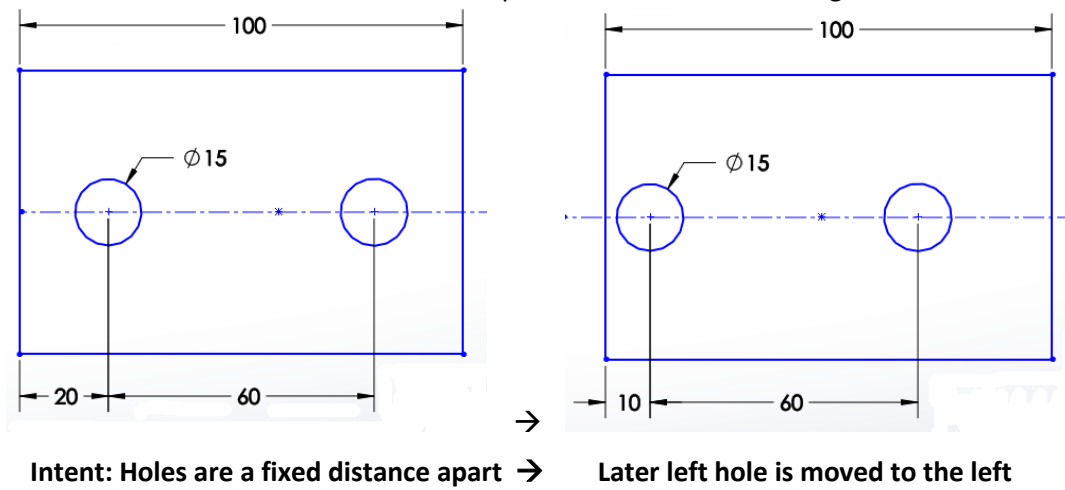
Consider a rectangular block with two circular holes. If the design intent is for them to always be specified distances from each end, then they would be dimensioned as below. That design choice allows the part length to change as needed.



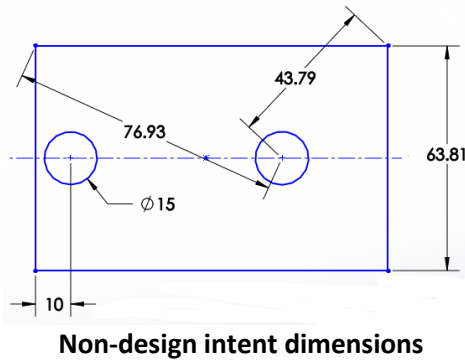
Had the designer needed the holes to always be located relative to the left end of the block, then the design intent dimensions would be:



But, if the holes have to remain a fixed distance apart then the choice of design dimensions would be:



If the last design intent was retained, but the part could be shown with the following dimensions:



The lengths shown are correct. However, they are improper dimensions since they require mathematical calculations to actually locate the right hole (or to physically scribe to arcs on the surface to find the correct one of two locations). Such calculations create the chance for introducing an error and placing the hole in an incorrect location. More importantly, they do not disclose the design intent and any later changes could invalidate that part and any assembly containing it.

Such a set of dimensions means one of two things. Either the solid model created the correct sized part, using the design intentions, and it was edited within the solid model by a person that did not know the design intent (included in available feature sketch dimensions), or the part was copied (reverse engineered) and the dimensions were added by a person that did not understand the original design intent reflected in the as built part which was copied.