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Datum Sequencing[1]

The order in which datums are specified determines how a part is to be positioned while inspecting the controlled feature(s). For instance, in Fig. 4-9A, the primary datum feature, datum feature A, controls the orientation of the part and must maintain a minimum of three points of contact with the top surface of the mating gage. In this case, the pin, datum feature B, easily assembles in the mating hole with a possible shift tolerance since it is specified at MMB.

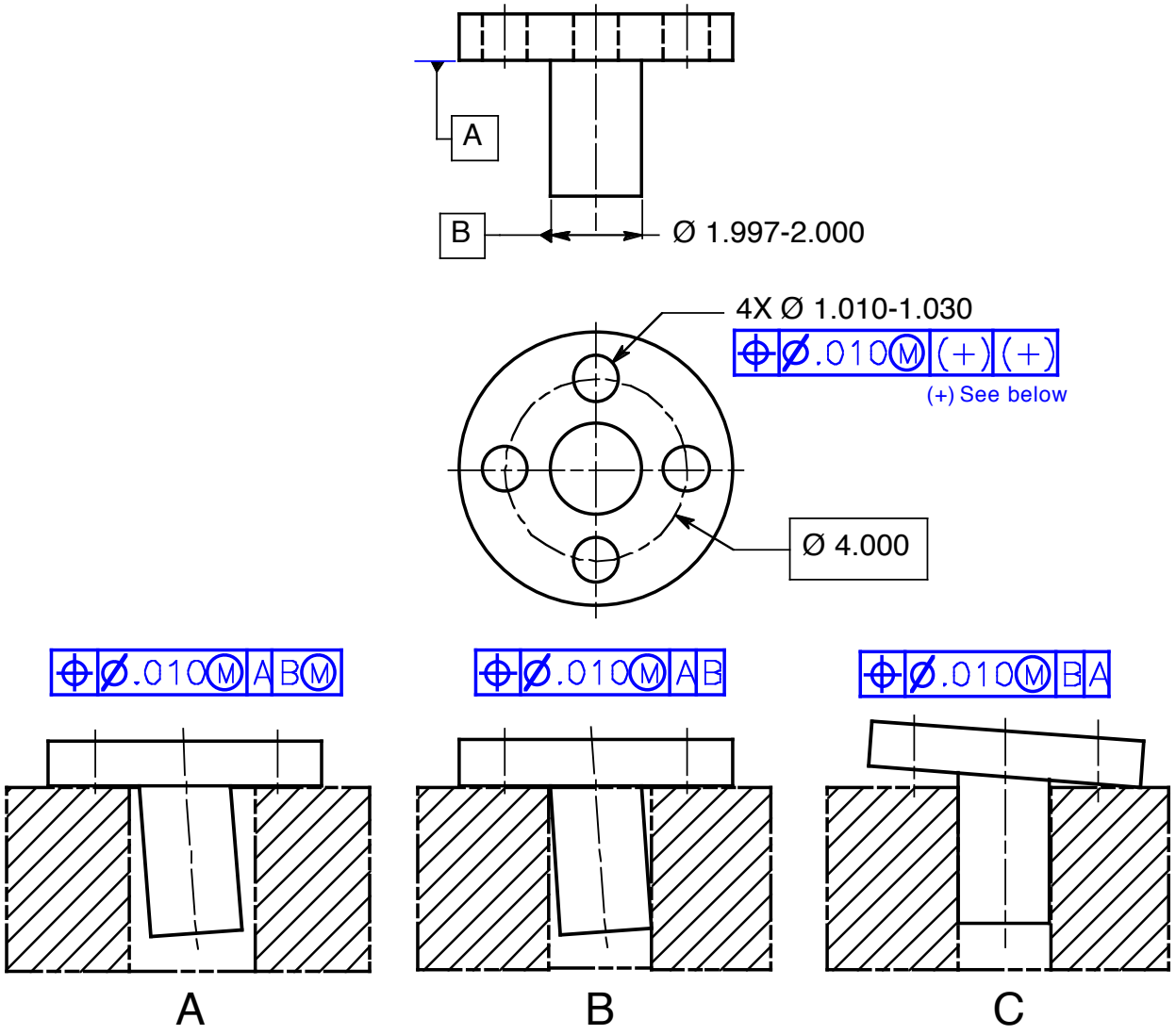

Figure 4-9 Datum feature of size specified at MMB, RMB, and as primary and secondary datum features.

In Fig. 4-9B, datum feature A, also must maintain a minimum of three points of contact with the top surface of the mating gage since it is again the primary datum feature, but the pin, datum feature B, specified at RMB, must make physical contact with the gage. Therefore, the hole size in the gage must be adjustable to contact the surface of the pin, datum feature B, even if it only

contacts the pin at two points. The RMB material condition modifier specifies that the pin may not shift in the hole. Datum feature B does not control the orientation of the part because it is not the primary datum feature.

In Fig. 4-9C, the pin, datum feature B, is the primary datum feature and is specified at RMB. Since the pin is the primary datum feature, it controls the orientation as well as the location of the part. Because the pin is specified at RMB, it must make physical contact and align with the hole in the gage. In this case, datum feature B on the gage must be adjustable not only to contact the surface of the pin, datum feature B, but also to align the pin with the gage using a minimum of three points of contact. Datum feature A may only contact the top surface of the gage at one point.

Datum Features of Size Specified at RMB

Datum features of size such as datum feature B must be specified with one of the material condition modifiers – regardless of material boundary (RMB), maximum material boundary (MMB), or least material boundary (LMB). If a datum feature of size is specified at **RMB**, processing equipment such as gages, chucks, and adjustable mandrels must make physical contact with the datum feature. This means that when gaging the 4-hole pattern to datum feature B specified as a secondary datum feature at RMB as in Fig. 4-9B, the inspector must use an adjustable gage in order to make physical contact with the pin to prevent it from shifting. The primary datum feature, datum feature A, controls orientation. In Fig. 4-9C, datum feature B is the primary datum feature; in this case, the inspector must use an adjustable gage in order to control both the oriented and located of the pin.

Datum Features of Size Specified at MMB

If a datum feature of size is specified at **MMB,** the size of the mating feature in the processing equipment has a constant boundary. The constant boundary hole in the gage is specified at either the maximum material condition or the MMC virtual condition of the datum feature. In other words when gaging the hole pattern to a datum feature of size, such as datum feature B in Fig. 4-9A, the simulated datum feature B hole in the gage is produced, in this case, at the maximum material condition size of the datum feature pin since datum feature B has no geometric tolerance.

[1]Cogorno, Gene R., ***Geometric Dimensioning and Tolerancing for Mechanical Design, Second Edition***, McGraw-Hill, New York, 2011, pp. 56.