Two Measures Are Required To Assure 6 Lobe Recess Quality

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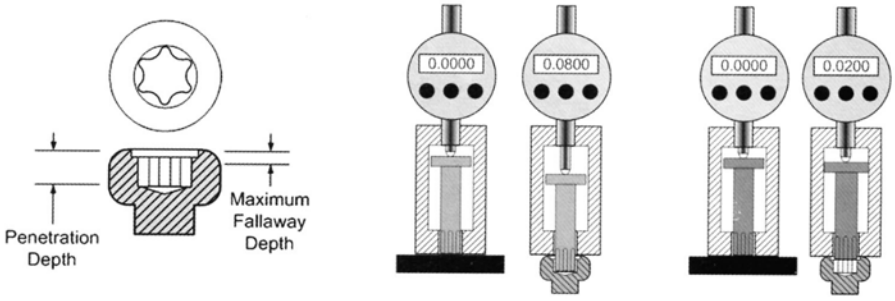

The 6 Lobe recess is one of the most popular fastener recess designs throughout the world for high volume fastener assembly applications. This recess design is particularly popular where consistent fastener tightness is critical to the quality and performance of the end product.

The 6 Lobe recess was initially developed by CAMCAR-Textron for the automotive fastener market in the late 1960's. The design was patented in 1971 and trademarked as the TORX® drive system. Before the original patent expired in 1988 the recess design had become widely used in a variety of industries due to the promotional efforts of CAMCAR and their worldwide network of fastener manufacturing licensees. A lot of credit for the recess's success was the thorough job of engineering done by CAMCAR including their design of a full array of gages and their insistence that their gages be used by all licensees to assure consistent recess quality.

After the expiration of the TORX® design patent, many non-licensed fastener manufacturers started producing screws with what has become known as the "6 Lobe" recess. Today only those companies who are licensed by CAMCAR-Textron can market this design as a "TORX® Recess" because even though the patent has expired the trademark is still active. Those who are not licensed by

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CAMCAR-Textron but use the TORX® name are in violation of international trademark laws.

Many 6 Lobe recess suppliers have produced marginal to poor quality recesses because there has been an absence of standards to use as guidance in manufacturing and inspecting these recesses. The lack of standards has lead to some critical misunderstandings of how the 6 Lobe recess should be inspected to assure acceptable quality. Probably many 6 Lobe parts have been produced with no gaging at all and most 6 Lobe recesses have been produced using the wrong or insufficient gaging.

In 1999, ISO published the first industrial standard in the world for the 6 Lobe design, designated as ISO 10664. In this standard the 6 lobe recess design is referred to as a "Hexalobular internal driving feature".

This ISO standard defines gaging requirements. To properly inspect a 6 Lobe recess two measurement inspections must be made:

1. **Recess Penetration:** The recess must be inspected for the ***penetration*** depth using a ***GO*** inspection element coupled to an indicator to provide a measurement. This is to determine if the recess has adequate depth to provide proper driver engagement.

2. **Recess Fallaway:** The recess must be inspected for the ***fallaway*** depth using a ***NOGO*** inspection element coupled to an indicator to provide a measurement. This element may enter the recess not more than a specified maximum depth. If the fallaway element enters the recess too far, the driver will fit very loosely in the recess and screw driving problems will likely occur at the point of assembly.

Recess Size	Maximum Fallaway	
	mm	inches
6	0.31	0.012
8	0.41	0.016
10	0.51	0.020
15	0.51	0.020
20	0.64	0.025
25	0.64	0.025
30	0.76	0.030
40	0.89	0.035
45	1.02	0.040
50	1.27	0.050
55	1.27	0.050
60	1.27	0.050
70	1.52	0.060
80	1.52	0.060
90	1.78	0.070
100	2.03	0.080

ISO 10664 states that the penetration depth requirements must be specified in the product standard or print. Regardless of the specified recess penetration depth the standard does specify the maximum allowable 'fallaway depth". Those maximum fallaway values are as follows:

GO/NOGO plug gages do not provide depth measurements and therefore do not provide adequate information to the manufacturer about the configuration of the 6 Lobe recess. Good 6 Lobe recess quality can only be thoroughly assessed and assured by measuring both the recess penetration depth and the recess fallaway depth during manufacturing.

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