FIXED FASTENER CASE
(when projected tolerance zone is used)

A maximum virtual area B within which the extending portion of fixed fastener can be is:

B = F + T2

Assembly of Part #1 with Part #2 is possible as long as no portion of a hole in Part #1 violates the same virtual area B:
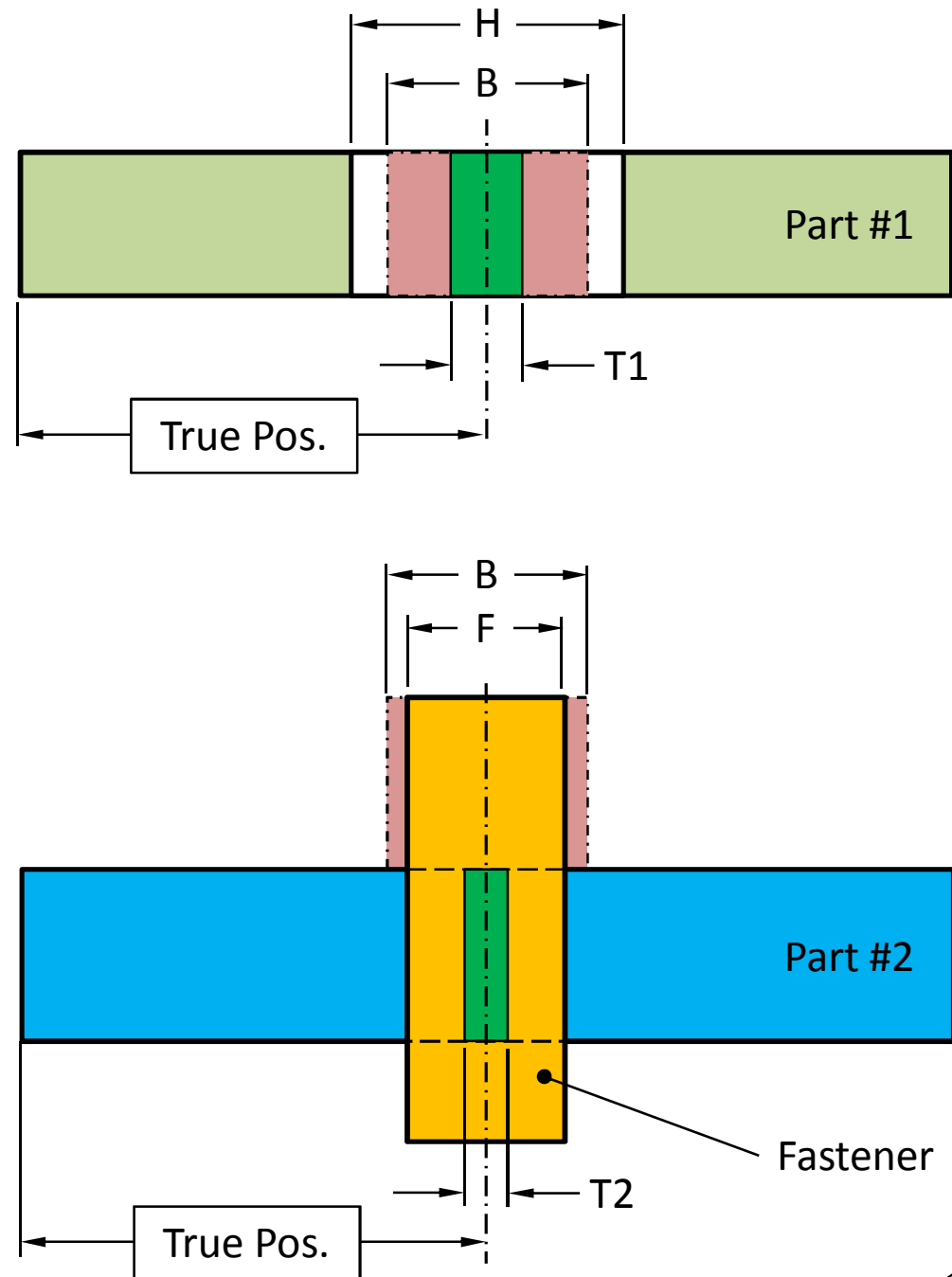
B = H − T1

Thus:

F + T2 = H − T1

T1 + T2 = H − F

If T1=T2=T:

2T= H − F

T = 1/2*(H − F)

'Classic' formula for positional tolerancing for fixed fastener case

H

B

Part #1

T1

True Pos.

B

F

Part #2

T2

Fastener

True Pos.

FIXED FASTENER CASE

(when projected tolerance zone is not used)

A maximum virtual area B within which the extending portion of fixed fastener can be is:

B = F + 2A

Assembly of Part #1 with Part #2 is possible as long as no portion of a hole in Part #1 violates the same virtual area B:
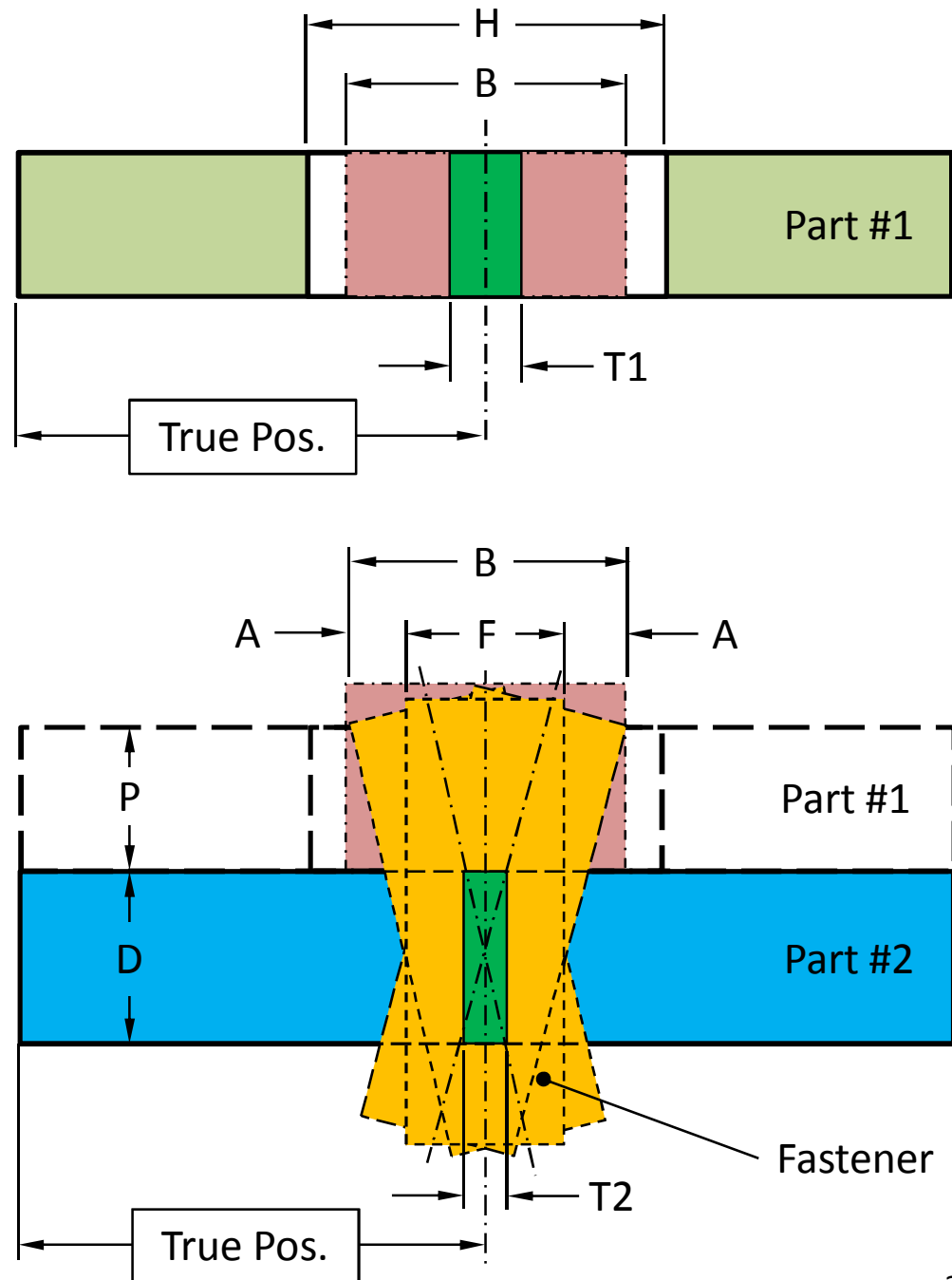
B = H − T1

Thus:

F + 2A = H − T1   (eq. 1)

But how to find A for eq. 1???

See next page

FIXED FASTENER CASE

(when projected tolerance zone is not used)

Using proportions for RED triangles:
$(P+D)/(A+1/2*T2) = D/T2$

After doing some maths:
$A=T2*(2P+D)/2D$

Placing A into eq. 1:
$F + 2*T2*(2P+D)/2D = H − T1$

Thus:
$H = F + T1 + T2*[1+(2P/D)]$

Formula for positional
tolerancing acc. to
appendix B.5 of Y14.5

A

P

D

Part #1

Part #2

Fastener

1/2*T2

T2