4 COMMON METHODS
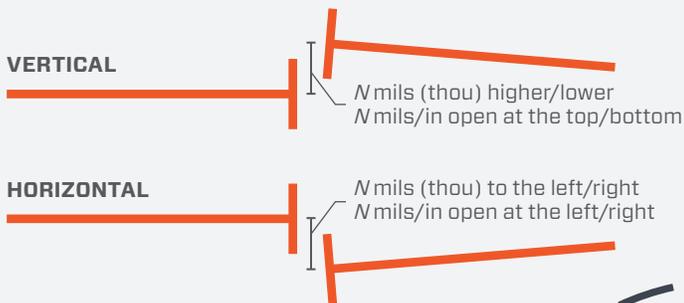## THERMAL GROWTH

LUDECA

Why Thermal Compensation? Machines aligned to tolerance in an offline state could be running misaligned due to thermal growth and dynamic loads, while online.

OEM

Information is provided by manufacturer through machine specifications.

VERTICAL

N mils (thou) higher/lower
N mils/in open at the top/bottom

HORIZONTAL

N mils (thou) to the left/right
N mils/in open at the left/right
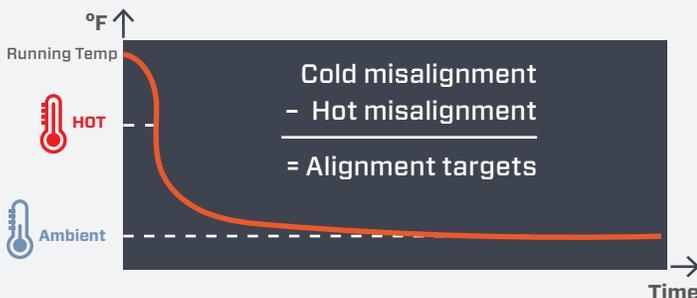
N = value provided by OEM

ADVANTAGES
No extra work needs to be performed.
Keeps your equipment within warranty.

DISADVANTAGE
Does not factor in operating conditions at your facility.

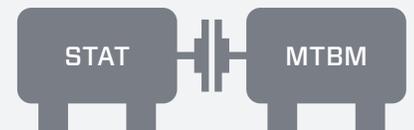$TG = T \times L \times C$, where

T = temperature change in °F

L = distance, in inches, from shim plane to shaft centerline

C = coefficient of thermal expansion in mils(thou) per inch per °F change in temperature

CALCULATING

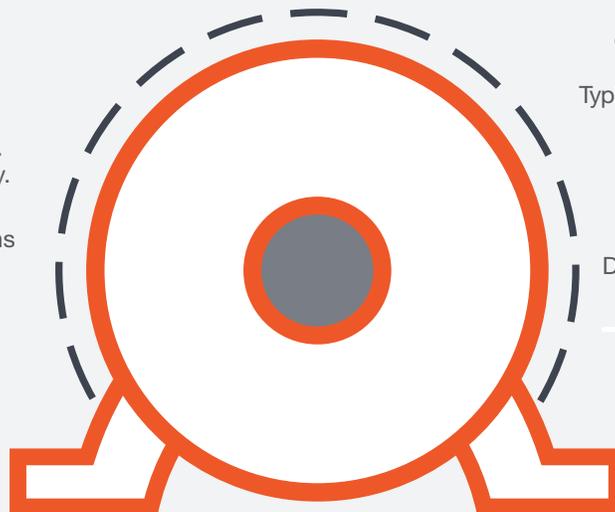Approximates thermal growth from the expansion of the machine casing at each bearing position.

STAT   MTBM

ADVANTAGES
Gives the direction and degree to which thermal growth will have an effect.
Typically accounts for most of the movement.

DISADVANTAGES
Requires an assumption about the average temperature for the casing.
Does not consider the dynamic effects of other factors.
Does not consider horizontal movement.

HOT & COLD CHECK

Laser readings are taken at the coupling when the machine is hot, and again when offline. The difference is used as alignment targets.

°F

Running Temp

HOT

Ambient

Cold misalignment
− Hot misalignment
―――――――――
= Alignment targets

Time

ADVANTAGE
Factors in horizontal and vertical thermal growth.

DISADVANTAGES
Does not factor in dynamic movement from online conditions.
Provides only a snapshot at time readings are taken.
Nearly impossible to get true running condition.
Depends how quickly the readings are taken.*

*__NOTE:__ Often, a hot check can be significantly cooler than running condition.

MONITOR

Alignment condition is tracked during ramp-up or coast down in real time.
Depending on laser mounting, relative or absolute movement can be measured.

OFFSET

ANGULAR
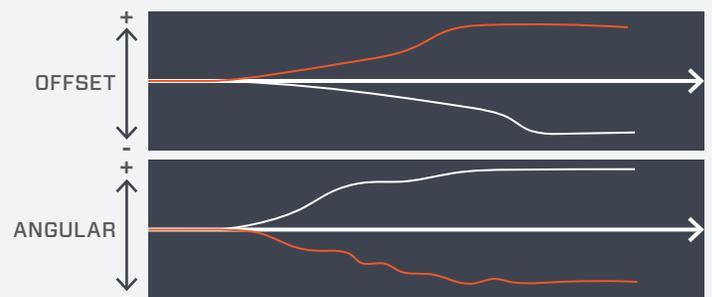
ADVANTAGES
Most accurate method for thermal compensation and dynamic movement.
Graph provides time of event, assurance of the quality of the readings.

DISADVANTAGES
Extra bracketing may be necessary.
Takes more time than other methods.

Keep it running.

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