READING LASER ALIGNMENT / SHAFT ALIGNMENTS RESULTS

Quite often I have been asked “what do these numbers mean” or “how do I use this information”. I hope after explaining it here, you can use the alignment results to better understand the value of precision laser alignment. Typically, if you use Elite Industrial for your laser alignment and shaft alignments needs you will receive an email within a few short days of job completion with the final alignment results attached. The attachments should look something like this:

First thing you should notice is the top heading. On the very left you will see the (A) unit location for the piece of equipment being aligned and occasionally there will be a “PRE” or “POST” text that will designate the before or after the laser alignment reading. This can be a very useful management tool because it lays out the value of doing alignments when comparing before and after results. To the right of the unit location in the center of the heading is (B) the date and time this was recorded. On the far right side is (C) the Model of tool used and version of software used.

This section is a representation of the equipment with true dimensions the Laser tool uses to perform the required math. With laser alignments there is always a Stationary and Moveable piece of equipment. The left side of the image is the stationary piece (pump/ gearbox/ compressor or any other type of shaft driven equipment), the right side is the movable piece (electric motor/ pneumatic motor/ engine or any other type of shaft driving equipment). The numbers are actual measurements the technician gathers and inputs into the laser tool which it then uses to calculate the correction needed to obtain a proper laser alignment.
During the shaft alignments, two different planes are being used to achieve proper collinear shaft alignment. These two planes are what we call "vertical" (top) and "horizontal" or (bottom).

By manipulating the Movable piece of equipment our goal is to align these two center lines of the pieces of equipment.

All of the values given for are in MILS. (1 MIL = .001”)

The numbers highlighted in blue are actual values at the feet of the moveable piece of equipment in each plane. These numbers do not carry as much weight as the numbers in red, which are actual values at the coupling. If you notice, there are also two separate planes within each VERTICAL and HORIZONTAL plane. These are our OFFSET (bottom) and ANGULARITY (top) values.

ANGULARITY is expressed as rise over run. For example: \(-2.4 / 1” = .0024”\) per inch of coupling. This means if a 6” coupling is being used, it will be angularly misaligned .00144” from the center line of the STATIONARY piece of equipment using this sample.

OFFSET is true to the value given. So \(-1.2 = .0012”\) offset from the center line of the STATIONARY piece of equipment.

Obviously there are target values in which we try to achieve. These are called SHAFT TOLERANCES and are not to be confused with COUPLING TOLERANCES.
Shaft Tolerances: The image below shows the standards we use for doing shaft alignments. These are pre-determined from the Laser OEM as Industry standards for proper SHAFT alignments. These are NOT tolerances for the couplings that are being used. This standard was created by Manufactures/OEMs of rotating equipment and industry professionals that determined this is the amount of misalignment any given machine at a certain RPM can withstand before corrections need to be made.

During the shaft alignments process the laser tool will use these target values to determine if or how much correction is needed. The images below show a bold or highlighted value that is out of tolerance (left) and a target value that is in tolerance which is no longer highlighted (right).

These are before and after of the same piece of equipment. This machine is now properly aligned and ready for a long and maintenance free life of production!

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