

TECHNICAL BULLETIN

Number 1031
Rev. 1

Subject: Superior Engine Connecting Rods Specifications and Re-Manufacturing

PROBLEM: Improper torquing, dimensional checks, and re-manufacturing techniques can lead to shorten connecting rod/bearing life and the possibility of failure.

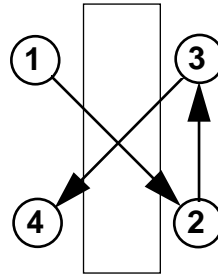
SOLUTION: The connecting rod (con rod) is one of several highly critical assemblies to the Superior engine and design specifications ensure that it will operate properly within intended environment. This bulletin outlines what areas need to be measured prior to installation as well as constraints and tolerances for re-manufacturing new style Superior engine con rods.

Torque: Prior to checking dimensional specifications, proper torque and sequence should be verified. The table below gives the final torque ranges for specific part numbers. **EnDyn** recommends a “step-up” (minimum of four -4- steps) using a criss-cross pattern with a *calibrated* torque wrench and lubricated threads/nuts.

An example of the proper torquing sequence for the P-030-082 consists of: Step (1): 75 ft. lbs., Step (2): 150 ft. lbs., Step (3): 225 ft. lbs., Step (4): 300 ft. lbs., Step (5): 300 ft. lbs. (always repeat final torque without over torquing). Note: if torquing procedure is not followed properly, all subsequent machining and dimensional specifications are suspect.

Engine Type	Con Rod Part Number	Final Torque Range (ft. lbs.)
Inline 510	P-030-116	125
Inline 825	P-030-117	340 - 360
Vee 825	P-030-082	280 - 300

Criss-Cross Pattern:



Dimensions: The attached Installation Data Sheet (IDS 14.004) assists in documenting the critical dimensions and clearances prior to installing a new or re-manufactured con rod (use owner manual's specifications). **EnDyn** recommends measuring all dimensions with a calibrated micrometers/gauges to ensure accuracy.

Part Number	Big Bore (w/o brg.)	Small Bore (w/o bush)	Small Bore (w/ bush)
P-030-116	5.113 - 5.114"	2.500 - 2.501"	2.2530 - 2.2535" (2.2545" max)
P-030-117	6.125 - 6.126"	3.748 - 3.749"	3.5015 - 3.5020" (3.5030" max)
P-030-082	6.788 - 6.789"	3.748 - 3.749"	3.5015 - 3.5020" (3.5030" max)

If the con rod big bore end measures .001-.0015" oversized or any fretting (cap/rod faces or bores) or signs of abnormal wear, the rod should be re-manufactured to new specifications. Roundness, tapers, and parallel specifications are discussed in the re-manufacturing section.

Note that as rods are continually re-manufactured by machining the cap to rod surface, the big bore dimension at the split line becomes slightly oversized. However, as long as a minimum of 90% of the big bore is within correct dimensions, the rod can be used in service.

Re-Manufacturing: Once a con rod has been determined as needing re-work, a qualified repair facility that follows the below recommendations should be chosen. The service facility should use the torquing procedures and final dimensions during re-manufacturing. However, **EnDyn** always recommends checking the above dimensions prior to final installation.

Prior to any machining, Non-Destructive Testing (NDT) of the con rod should be performed to determine if any stress cracks have formed during operation (this is typically done by magnaflux). Even though the entire rod is checked, most surface cracks appear in the throat area.

Machining tolerance recommendations include bores parallel within .002", perpendicular to faces within .001", and max taper at .0005". The small bore (with

bushing installed) has a max taper allowance of .00025". The big bore end should be honed to final dimensions at 40 rms. Also note that the cap to rod faces should be machined/lapped to provide a minimum of 80% contact (when using Prussian Blue).

EnDyn recommends replacing the old castelated nuts/bolts with the new style high grade elastic stop nuts; the elastic stop nuts should be replaced each time the rod is re-manufactured and/or at each overhaul. The bolts should be magnafluxed during re-manufacturing and/or at each overhaul and replaced as required. Also, bushings should be frozen prior to installation to reduce stresses while being pressed into place. Dowels and washers should be visually inspected to see if replacement is necessary.

Note that if a service rod has been exposed to extreme heat (via failure resulting in "bluing/browning"), the con rod assembly should be replaced due to permanent material deformation. Note that **EnDyn** does not recommend "metallizing" or "sleeving" any part of the rod.

For further information or questions concerning con rod installation, specifications, or re-manufacturing, please contact **EnDyn's** Technical Department or your local **EnDyn PowerParts®** Distributor.