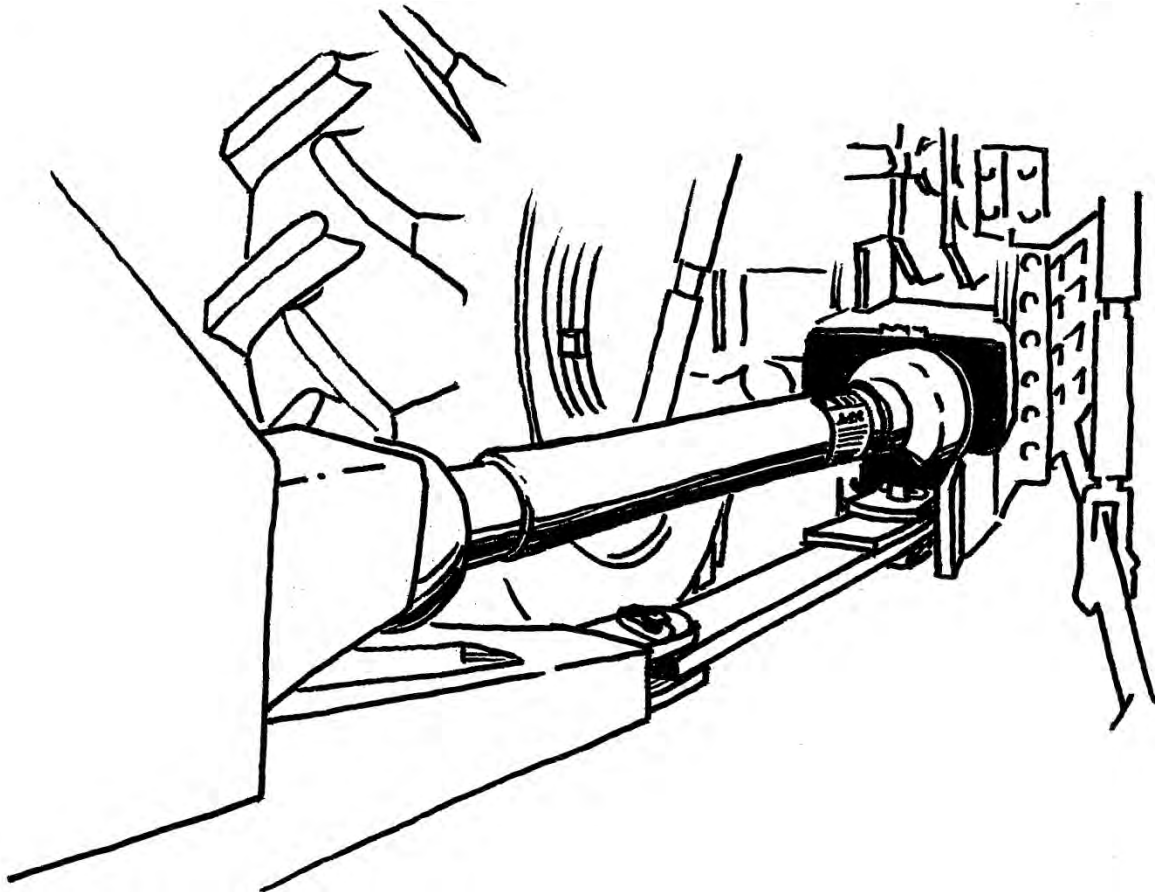


Power Take-Off (PTO) Drive Shaft Design and Safety Checklist

For OEM Designers and Engineers



Agriculture is recognized as one of the more hazardous occupations. Today's farmer spends long hours in close proximity to increasingly complex and powerful machinery. In order to avoid accidents, everyone from the component suppliers, to the company who manufactures and assembles the machinery, to the dealers, and ultimately the actual user must keep safety in mind.

ADMA is concerned that PTO drive shafts be used in the safest possible manner. This checklist consists of safety information directly related to the PTO drive shafts of agricultural implements. More information may be found in general safety literature and in the relevant standards published by the American Society of Agricultural and Biological Engineers (ASABE), the Canadian Standards Association (CSA), the International Standards Organization (ISO) and the Society of Automotive Engineers (SAE).

GUARDING / SHIELDING – *For hazards which cannot be effectively eliminated, guarding or shielding must be provided.*

- ÿ The tractor PTO master shield, PTO drive shaft guard, and PIC guard should provide an effective interactive shielding system throughout the range of expected operating conditions.
- ÿ Specify and test the drive shaft guard with end bell cones which overlap, but do not interfere with the tractor PTO master shield or PIC guard.
- ÿ Specify and test guards designed to operate in the expected environmental and operational conditions.
- ÿ Provide a PIC guard which overlaps with the drive shaft guard to provide guarding of the shaft coupling and any torque limiting device installed on the drive shaft.
- ÿ Make sure that secondary drive shafts (drive shafts that do not attach to the tractor PTO) are fully guarded or adequately guarded by location. Secondary drive shafts with guards should also use PIC guards on both ends.
- ÿ Check that all routine maintenance of the drive shaft can be performed without complete removal of the guards or shields.
- ÿ If the drive shaft guards have a restraint device to prevent them from rotating with the drive shaft, provide an attachment point on the implement.
- ÿ Make sure the drive shaft meets all local regulations and standards for the region or country where the machine will be sold.
- ÿ Make sure that the packaging or shipping method for the drive shaft from the factory to the dealer does not damage the drive shaft guarding or deform the guard cones.

WARNINGS AND INSTRUCTIONS – *Warnings shall be provided for hazards associated with the machine. Instructions should be provided for proper operation, maintenance and repair.*

- ÿ Provide safety signs on the implement to warn that the tractor master shield, drive shaft guard and PIC guard must be kept in place.
- ÿ Provide safety signs on the implement to alert the user to proper hitch dimensions and normal PTO operating speed.
- ÿ Check that proper safety signs are supplied with the drive shaft (replacements are available from your drive shaft supplier).
- ÿ Provide easy to understand instructions for proper drive shaft operation, maintenance (including regular lubrication intervals), and repair in the operator's manual.
- ÿ Advise against the use of PTO adaptors which may defeat the purpose of the tractor's master shield and adversely affect the performance of the drive shaft.
- ÿ Advise the user to use only the original equipment specification replacement parts.

Further information about PTO drive shaft specifications and safety may be obtained from your ADMA PTO driveshaft supplier.

Go to www.admausa.com to find a list of industry standards relevant to PTO powered equipment.

Standards may be found at www.asabe.org.



Agricultural Driveline Manufacturers Association

Member Companies:

Benzi America, Inc.
Comer Industries
Neapco Components, LLC.
Weasler Engineering, Inc.

Bondioli & Pavesi, Inc.
G&G Manufacturing Co.
Walterscheid, Inc.

