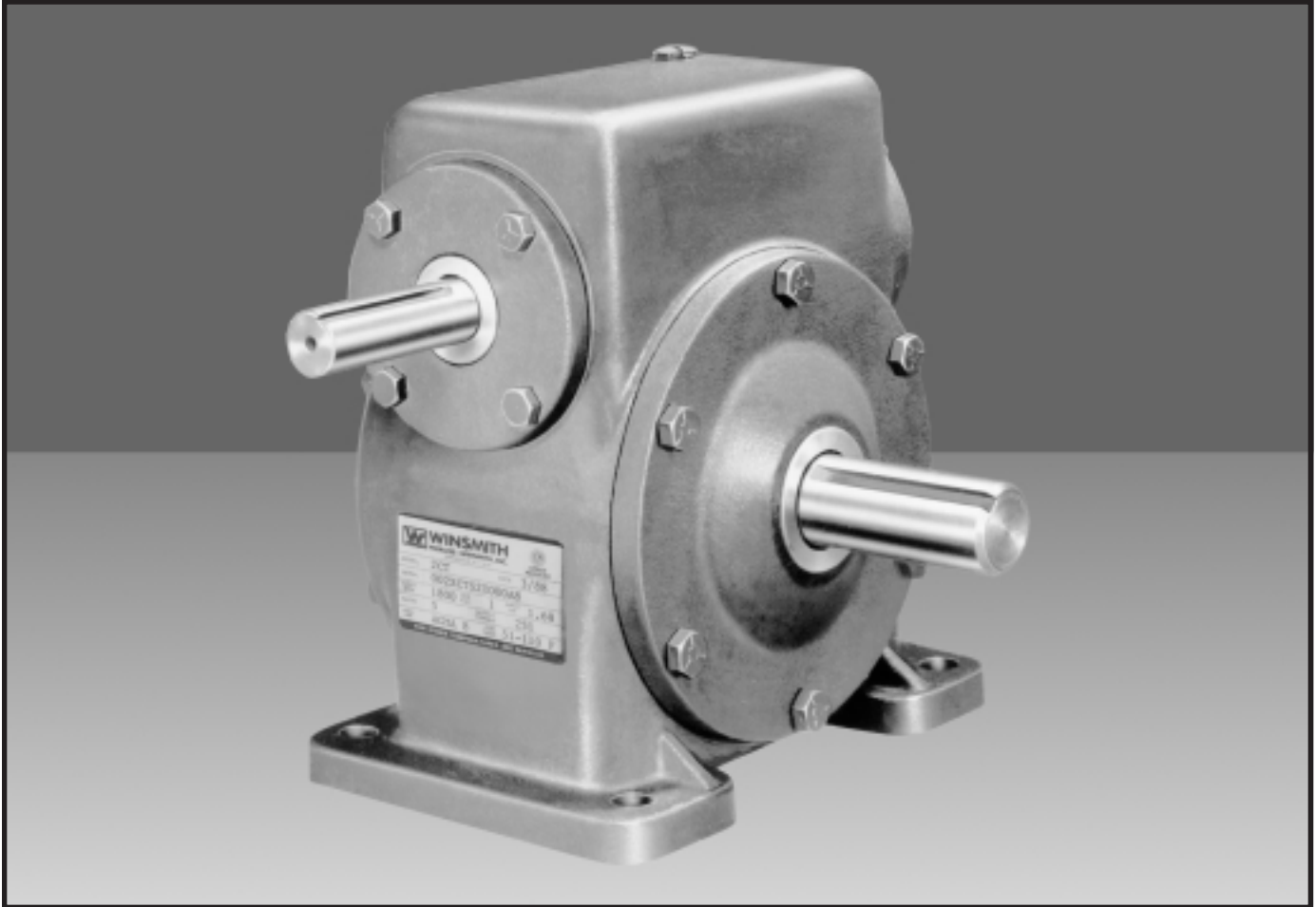




C-Line Worm Gear Speed Reducers



Installation, Operation and Lubrication Instructions



PROPER SELECTION

The selection of the appropriate speed reducer for a given application requires that all factors affecting the operation of the unit be given careful consideration. Service factors must be applied to catalog ratings depending on the type of prime mover used, severity of the application and duration of daily service. If you have any questions relative to the suitability of your WINSMITH® speed reducer for your particular application, refer to the selection section of the appropriate WINSMITH catalog or contact your WINSMITH representative or distributor.

PROPER ALIGNMENT

1. The various drive members (motor, speed reducer, couplings, sprockets, sheaves, gears, etc.) should be aligned as accurately as possible to guard against unusual stresses and overloads imposed by misalignment.
2. If a prime mover shaft is to be directly connected to the high speed (input) shaft; or if the slow speed (output) shaft is to be directly connected to the driven shaft, flexible couplings should be

used. It should be remembered that even flexible couplings have limited ability to accommodate misalignment. Care must be taken at installation to insure that shaft alignments are within the limits recommended by the coupling manufacturer. Use of a rigid coupling to connect speed reducer shafts to other drive components is not recommended as it is almost impossible to obtain exact alignment between two shafts.

3. A common base plate supporting the motor and reducer will help preserve the original alignment between reducer and motor shafts. If a structural steel base is used, the plate should be at least equal in thickness to the diameter of the bolts used to fasten the speed reducer to the base plate. Also, for sufficient rigidity, the design in general including angle or channel members should be substantial enough to prevent flexing under vibration. After the first week or two of operation all of the bolts and nuts used to fasten the reducer and motor, pedestal, etc., to the base plate should be retightened. Vibration tends to loosen the nuts even if tight initially. Dowelling the motor and speed reducer to the base plate will help insure that alignment is maintained.





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LUBRICANT

1. FACTORY FILLING

WINSMITH speed reducers are filled to the proper level prior to shipment with the appropriate grade of oil for operation in an industrial environment. **The oil level should be checked prior to operation, using the oil level plug provided for that purpose.**

2. AMBIENT TEMPERATURE

If ambient temperatures are abnormally low or high, the type of lubricant installed at the factory may be unsuitable. See the chart in this bulletin for extreme temperature lubricant recommendations.

3. INITIAL OIL CHANGE

The oil in a new speed reducer should be drained (using the drain plug provided) at the end of 250 hours of operation. (30 days for 8 hour per day service, 15 days for 16 hour service, 10 days for 24 hour service).

4. OIL CHANGING

When changing oil for any reason, it should be remembered that oils of various types may not be compatible. Therefore, when changing to a different oil, it is recommended that the housing be completely drained and thoroughly flushed with a light flushing oil prior to refilling with the appropriate lubricant. Under normal conditions, after the initial change, the oil should be changed after every 2500 hours of operation, or every six months, whichever occurs first. Under severe conditions (rapid temperature changes, moist, dirty or corrosive environment) it may be necessary to change oil at intervals of one to three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval. If a speed reducer is to stand idle for an extended period of time, (such as when used as a spare) it is recommended that the unit be filled completely with oil to protect interior parts from rust and corrosion due to condensation inside the housing. Be sure to drain the oil to the proper level before placing the speed reducer into service.

5. GREASE FITTINGS

Some WINSMITH reducers are equipped with grease fittings to lubricate bearings not adequately lubricated by the oil splash. These fittings should periodically be pressure lubricated with a high quality lithium base NLGI #2 bearing grease compatible with the type of lubricant being used.

6. OIL TEMPERATURE

Speed reducers in normal operation can generate temperatures up to 200°F depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures). Excessive oil temperatures may be the result of one or more of the following factors:

A. OVERLOADS

An overload, due to the original selection of a unit too small for the application, or increasing loads on the speed reducer to a point where its rating is exceeded after it has been in service for a period of time. Always check the speed reducer rating when increasing driven loads or increasing the horsepower rating of the motor or other prime mover.

B. OVERFILLING OR UNDERFILLING

If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug and allow oil to drain until oil ceases to drain from the level hole, reinstall the oil level plug, and restart the drive. If the speed reducer is underfilled, the resultant friction can cause overheating. If this occurs, fill the speed reducer to the oil level plug hole.

C. INADEQUATE COOLING

In order to dissipate internally generated heat, the speed reducer must be installed in such a way that air can circulate freely. Tightly confined areas (inside cabinets, etc.) should be avoided. If this is not possible, forced air cooling by means of a separate blower or a fan integral to the speed reducer should be used.

7. OIL RETENTION

A. VENT PLUGS

To prevent loss of oil during shipment, WINSMITH speed reducers are shipped with a brass pin in the vent hole in the filler and vent plug. This pin must be removed before the reducer is put into operation. Failure to remove the brass pin can result in pressure build up which can pump oil through the seals. If the speed reducer is installed in an atmosphere containing exceptional amounts of moisture or dust, a shielded or hooded vent plug should be used.

B. OIL SEALS

Although WINSMITH uses high quality oil seals and precision ground shafts to provide a superior seal contact surface, it's possible that circumstances beyond WINSMITH's control can cause oil seal leakage (damage during shipment or installation, etc.). When replacing a shaft oil seal, using the following suggestions will help to insure leak-free operation and long seal life.

- When installing a new seal, wrap the shaft with light shim stock or heavy paper to protect the seal lip from being damaged by a rough shaft or cut by the sharp edge of the keyway.
- A sealant should be used between the O.D. of the seal and the I.D. of the bore into which the seal is installed. The seal bore should also be free of any burrs, nicks, or scratches.
- Be sure that the seal is not cocked in the seal bore. The outer face of the seal should be flush with the surface into which it is mounted.

Lubricants

Worm Gear Reducers

For special applications that involve severe ambient temperature extremes or a seasonal oil requirement, WINSMITH, based on extensive testing and field experience, recommends the use of Mobil SHC synthetic lubricants.

Ambient Temperature	-30 to 15°F	16 to 50°F	51 to 95°F	51 to 95°F	96 to 131°F	96 to 131°F
ISO Viscosity Grade	220	460	680	460	680	460*
AGMA Lubricant No.	5 S**	#7 Compounded***	#8 Compounded***	#7 Compounded***	8 S**	7 S**
Mobil	SHC 630	600W Super Cylinder	Extra Hecla Super	600W Super Cylinder	SHC 636	SHC 634

**synthetic oil

***3% to 10% fatty or synthetic oils or mild EP additives

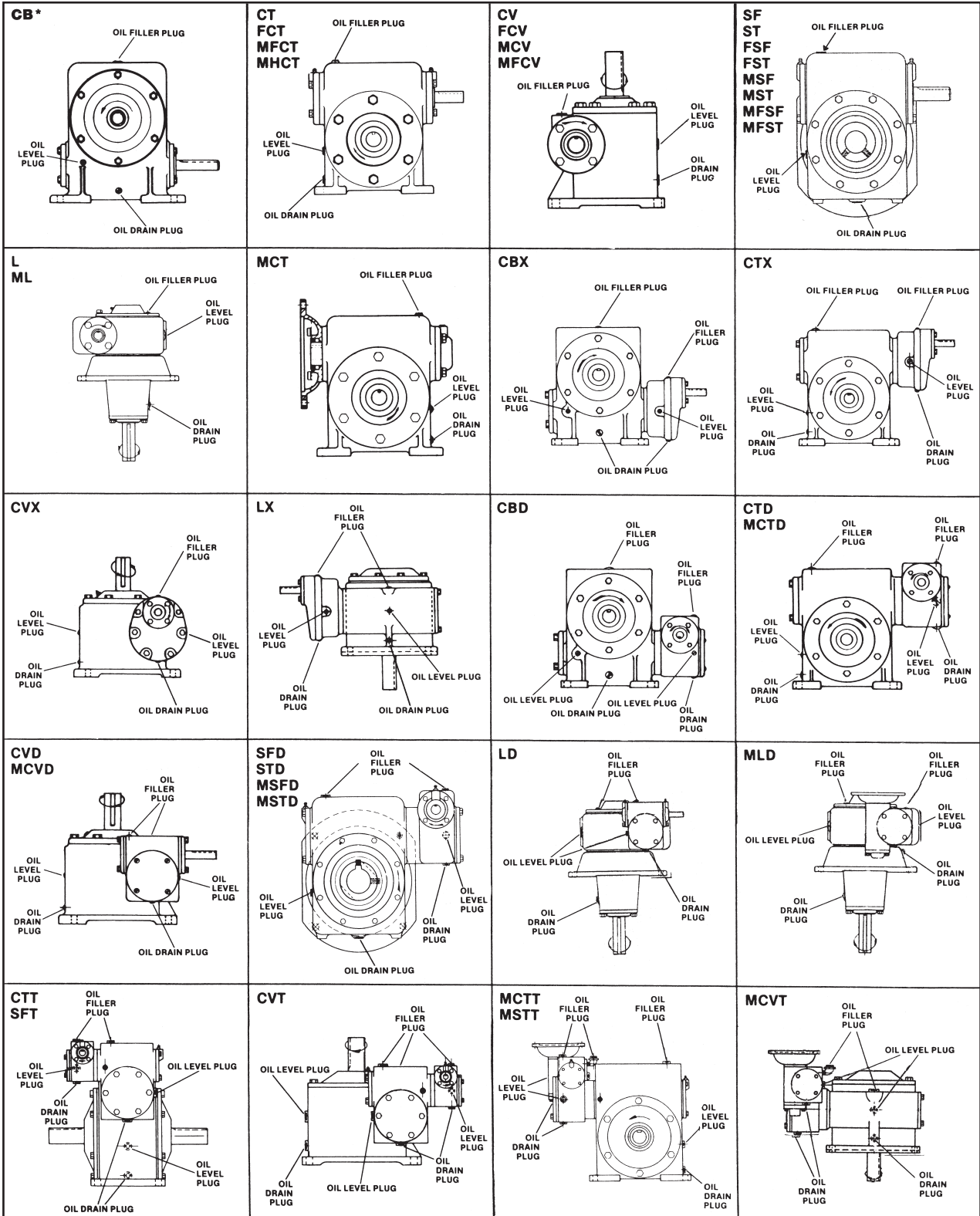
Viscosity grades are based on Lubrication Standard ANSI/AGMA 9005-D94.



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*For input speeds below 1160 RPM, the oil level must be raised to lubricate the slow speed bearings.



Warnings And Cautions



WARNING

Warnings

Winsmith products, and associated equipment and machinery, are intended for selection and use by trained and skilled persons capable of determining their suitability for the specific application or use. Proper selection, installation, operation and maintenance, including implementation of adequate safety precautions, are the responsibility of the purchaser or user. The following safety precautions, as well as additional safety precautions that may be required for the specific application or use, are the responsibility of the purchaser or user. **FAILURE TO OBSERVE REQUIRED SAFETY PRECAUTIONS COULD RESULT IN SERIOUS INJURY TO PERSONS OR PROPERTY OR OTHER LOSS.**

Lock-out/Tag-out

It is **EXTREMELY IMPORTANT** that equipment or machinery does not unexpectedly start. To prevent this possibility, all electrical or other input power sources must be turned off, and properly locked out. Tag out procedures must be followed before working on or near the reducer or any associated equipment. Loads on the input and output shafts should be disconnected prior to working on any reducer. Failure to observe these precautions may result in serious bodily injury and/or property damage.

Grounding

Be sure the reducer and associated equipment are properly grounded and otherwise installed in accordance with all electrical code requirements.

Protective Guarding / Loose Clothing, etc.

Always insure there is proper protective guarding over all rotating or moving parts. Never allow loose clothing, hair, jewelry and the like to be worn in the vicinity of rotating or moving parts or machinery. The purchaser or user is responsible for complying with all applicable safety codes. Failure to do so may result in serious bodily injury and/or damage to property or other loss.

Selection & Installation

This speed reducer and associated equipment must be selected, installed, adjusted and maintained by qualified personnel who are knowledgeable regarding all equipment in the system and the potential hazards involved.

Consult Catalog Ratings

Load, torque and other requirements must not exceed the published ratings in the current catalog and/or on the speed reducer nameplate. The reducer selected must be consistent with all service factors for the application. See Winsmith catalogs and www.WINSMITH.com.

Brake Torque Loads

Whenever a brake or any other stopping force is involved in an application, braking torque loads imposed on the speed reducer must not exceed the allowable load ratings.

Not a Brake

Speed reducers should never be used to provide the function of a fail safe brake or an assured self locking device. Speed reducers must never be used to replace a brake or a critical braking application function.

Excess Overhung Loads

Excessive overhung loads on the input or output shafts of a speed reducer may cause premature fatigue failures of the bearings and/or shafts. Mount gears, pulleys and sprockets as close to the housing as possible to minimize such loads. Do not exceed catalog ratings.

Excess Thrust Loads

Excessive thrust loads on the input or output shafts of a gear reducer may cause premature failure of bearings. Do not exceed catalog ratings.

Alignment

Properly align any input and output power transfer elements connected to the speed reducer. Even slight misalignments in a rigid mounting system may cause binding, large vibration forces or excessive overhung loads, leading to premature bearing, shaft, or speed reducer failure. Use of flexible couplings that allow the reducer and connected transfer elements to self-align during operation will compensate for minor misalignments.

Not a Support Structure

A speed reducer must never be used as an integral component of a machine superstructure or support frame that would subject it to additional loads other than properly rated loads transmitted through the shafts.

Mounting Position

The speed reducer should be mounted in one of the mounting positions shown in the catalog. Different mounting positions should not be used without contacting Winsmith as this may result in improper lubrication.

Overhead Mounting

Mounting of a speed reducer in overhead positions may be hazardous. Use of external support rails or structure is strongly recommended for any overhead mounting.

Lifting Eyebolts

Any lifting supports or eyebolts provided on the speed reducer are supplied with the purpose of vertically lifting only the speed reducer, without any other attachments or motors. Inspect such supports and bolts before each use.

Properly Secure Mounting Bolts

Proper mounting bolts and proper torques must be applied and maintained to insure the speed reducer is securely mounted to the desired machinery. Inspect regularly as machine vibration may loosen fasteners.

Thread Locking Compound

Proper thread locking compound should be appropriately applied to the cleaned threads of all mounting bolts connecting or securing the speed reducer to equipment and any drive, accessories, or brake components attached to the speed reducer. If, at any time after installation a factory supplied assembly or construction bolt is removed, care must be taken to thoroughly clean off the old thread locking compound and a new appropriate thread locking compound must be applied. Failure to properly apply new thread locking compound on all mounting or reducer construction bolts may result in serious injury or death from falling mechanical components.

Reducer Surface Is Hot

Operating speed reducers generate heat. Surface temperatures may become hot enough to cause severe burns. Proper personal protective equipment should be used.

Noise

Operating speed reducers may generate high noise levels. Use appropriate hearing protection and avoid extended exposure to high noise levels.

Lubricants Hot and Under Pressure

The temperature of lubricants inside a speed reducer may be very high. The reducer should be allowed to cool to ambient temperature before removal of any vent, drain, level, or fill plugs, and before removing seals or bearing covers. Speed reducers without a pressure vent may also be under great internal pressure. Slowly loosen the lubricant fill plug above the lubricant level to vent any internal pressure before further disassembling.

Lubricant Contact

Contact with lubricants can present safety concerns. Proper personal protective equipment should be used whenever handling speed reducer lubricants. Consult the lubricant MSDS sheet which is often available on the lubrication manufacturer's website.

FDA, USDA, and NSF Applications

Factory supplied lubricants may not be suitable or safe for applications involving food, drugs and similar products. This includes applications subject to FDA, USDA, NSF or other regulatory jurisdiction. Consult the lubricant supplier or Winsmith for acceptable lubricants.

Inspection and Lubrication

Ensure proper operation by regularly inspecting the speed reducer and following all maintenance, operation and lubrication guidelines.



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