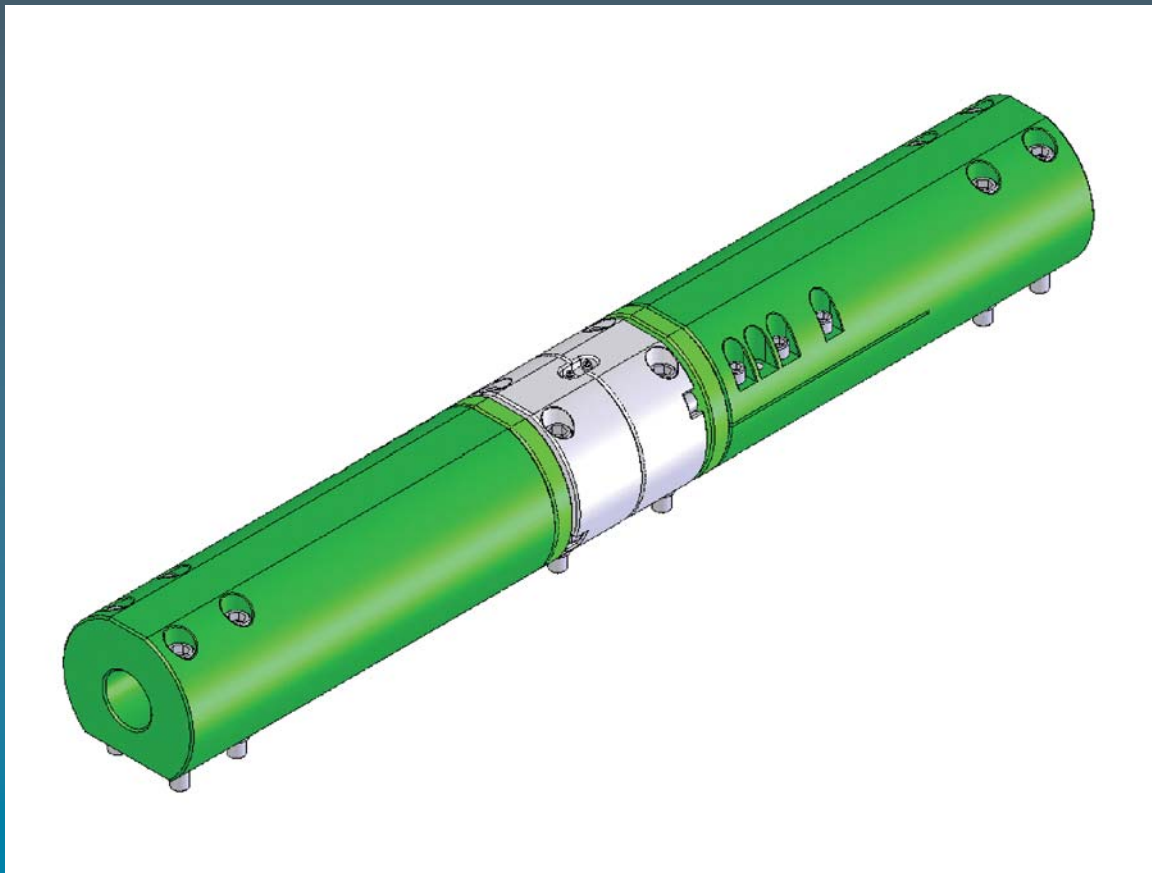


# D-M-E Helical Gear Stack Mold Centering Devices



# SECTION A

## Safety Procedures

### Helical Gear Stack Mold Centering Devices

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## Safety Procedures

### Lifting and Carrying

Contact supervision if you have any questions or are not sure about the proper procedures for lifting and carrying.

Improper lifting or carrying can result in serious injury — especially back injury. The following suggestions may help you to avoid injury.

Before lifting or carrying an object, determine the weight and size by referring to such things as tags, shipping data, labels, marked information, or manuals. Inspect the load for nails or other protrusions that might cause injury. Decide if it can be moved by one person, or several, or whether a device such as a crane or fork lift is required. Get any necessary help before proceeding.

If in doubt as to the size or type of lifting equipment, method, and procedures for lifting, contact D-M-E before proceeding to lift the machine or its components.

Before inserting an eyebolt, be certain that both the eyebolt and the hole have the same size and type threads. Do not attempt to use a metric thread bolt in an English thread hole or vice versa. To attain safe working loads, at least 90% of the threaded portion of a standard forged eyebolt must be engaged.

# SECTION A

## Safety Procedures

### Helical Gear Stack Mold Centering Devices

#### Lifting and Carrying by Hand

Make sure your footing is secure. Crouch as close to the object as practical. Get a good grip on the object. Lift slowly by straightening your legs. (Keep your back relatively straight. Your arm and leg muscles, not your back, should do the work.) Keep the load close to your body as you come up.

Lift the load to the carrying position. If it is necessary to change your direction when in the upright position, turn your body with changes of foot positions. Be careful not to twist your body.

If you set the load on a bench or table, place it on the edge to allow the table to take part of the weight. Then push the load forward using the arms, or if necessary, part of the body.

If you must lift the object higher than your waist, first lift the load waist high and rest it on a support (as described in the preceding paragraph). Then change your grip and bend your knees again to give added leg muscle power for the final lift.

When carrying an object, always have a clear vision over the load. Do not try to change the load's position, or adjust it, while you are in motion. If the load interferes with normal walking, get help.

When putting the load down to the floor surface from a waist high carrying position, bend the knees and with a straight back and the load close to the body, lower the object with the arm and leg muscles.

#### Lifting and Carrying by Mechanical Device

Use power hoists, or other mechanical lifting and carrying devices, for heavy objects that exceed weights set forth by safety standards, or your own physical limitations. Objects that are bulky or hard to handle should also be lifted or carried with the aid of mechanical devices, rather than by hand. This can help you avoid injury. Use hook-up methods recommended by your safety department, and know the signals for safely directing a crane operator.

There are many other safety suggestions that could be made. If there is a question regarding safety, ask a trained person in your company, or call the D-M-E representative in your area.



#### WARNING

*Regularly inspect slings, chains, hoists and other lifting devices. For frequency of inspection, refer to the Williams-Steiger Occupational Safety and Health Act, 29 CFR 1910.184, and any instructions applicable to the equipment. Any unsafe equipment should be properly repaired or immediately discarded. Failure to follow these instructions may result in serious personal injury and/or machine damage.*



#### WARNING

*Cranes, hoists, slings, eyebolts, and other lifting equipment have safety-rated capacities which should never be exceeded. Before using any lifting equipment, make sure the equipment is adequate for the load and application. Refer to standards and instructions applicable to any lifting equipment you use. (For example, USAS standard B18.15, published by the American Society of Mechanical Engineers, United Engineering Center, New York, contains information concerning safe lifting loads for different size eyebolts, for various angles of lift, and for varying applications.) Failure to follow this instruction may result in serious personal injury and/or machine damage.*



#### WARNING

*Never place any part of your body under a suspended load or move a suspended load over any part of another person's body. Be certain that you have a safe spot for depositing the load before lifting it. Failure to follow these instructions may result in serious personal injury and/or machine damage.*



#### WARNING

*Before installing, removing, or maintaining the stack mold centering device in an injection molding machine, follow the lockout/tagout procedure for the injection molding machine. Failure to follow this instruction may result in serious personal injury.*

# SECTION A

## Safety Procedures

### Helical Gear Stack Mold Centering Devices

## Handling the HGSN Stack Mold Centering Device

The following steps must be followed when lifting, handling, installing, removing, operating or maintaining the D-M-E Helical Gear Stack Mold Centering Device. The instructions pertain to one Centering Device assembly, and should be repeated for each assembly.

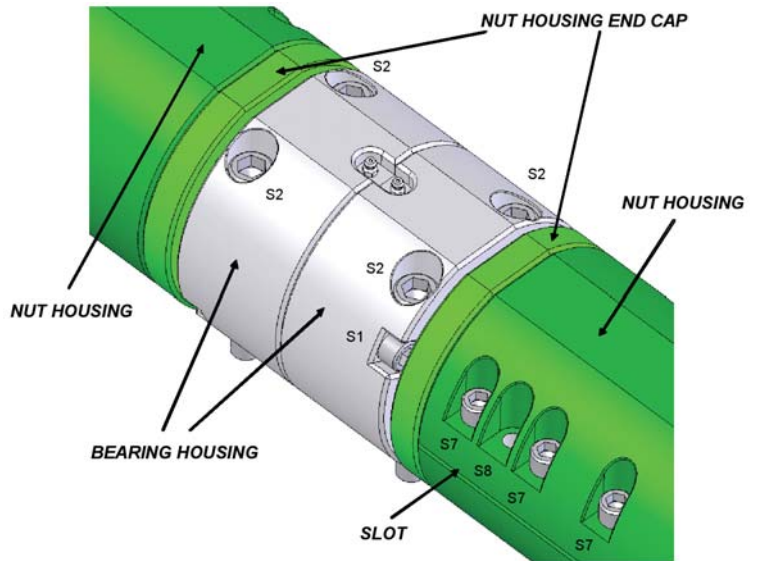
There is a red Installation Strap supplied with each assembly. During lifting, handling, installing or removing the Centering Device, one strap per assembly needs to be installed to span over the two Bearing Housings to prevent either of the two Nut Housings from sliding off the Helical Gear Shaft, and to maintain the fixed openings between the individual Nut Housing End Caps and Bearing Housings.

There are three eyebolt holes per Nut Housing, 90 degrees apart from each other. Use one eyebolt per Nut Housing (two eyebolts per assembly). Choose the best eyebolt locations (there are three to choose from) on the two Nut Housings in line so the hoisted assembly is horizontal while installing it on the mold.

Use the four Alignment Rods that are shipped with your order when mounting the assembly to the mold. The Alignment Rods are approximately 300mm long, and they are for properly prealigning the assembly when it approaches the mold. If the installation takes place while the mold is in the injection molding machine, the 300mm Alignment Rods may be too long for the available space. In this case, cut the rods to shorter lengths, so there is enough room to lower the Centering Device, and the corresponding mounting holes can align to the Alignment Rods screwed in the mold, one rod per Nut Housing and Bearing Housing.

Screw the four Alignment Rods into the tapped holes with tubular dowel bores in line. See Steps 4 and 5 in the On-Site Setup and Adjustment section.

The hoisted assembly needs to stay in horizontal orientation during the whole process.



### WARNING

*When the mold is closed, the gap between the Bearing Housing and the Nut Housing End Cap is very small and can pinch or crush anything that is in between them. Do not leave tools, screws, etc. between these surfaces. Failure to follow this instruction may result in serious personal injury and/or machine damage.*



### WARNING

*If this stack mold centering device is installed on an injection molding machine with a motion/no motion key switch, all pinching and shearing points in the mold area must be guarded (ref: ANSI B151.1-1997, clause 7.8). Failure to follow this instruction may result in serious personal injury.*

## SECTION B General Description

### Helical Gear Stack Mold Centering Devices

#### General Description



The function of the D-M-E Helical Gear Stack Mold Centering Device is to provide equal and synchronized parting line openings for stack molds. The stack mold can be a standard, spin-stack or other type where centering of the center portion of the stack mold or center platen of a Dual Mold Carrier between the stationary and moving platen is required.

The main functional components in an assembly are a double-helical Gear Shaft with a left hand thread on one end of the shaft, a right hand thread on the other, as well as two mating Nuts that fit on the corresponding threads.

The Gear Shaft is retained by a pair of Tapered Roller Bearings in the Bearing Housings, and the Nuts are held in the Nut Housings.

A stack mold usually needs two or four assemblies to operate. The D-M-E Helical Gear Stack Mold Centering Device is adjustable, which means that the device can be adjusted to compensate for differences between the moving and stationary side stack heights.



# SECTION C

## Assembly and Initial Setup

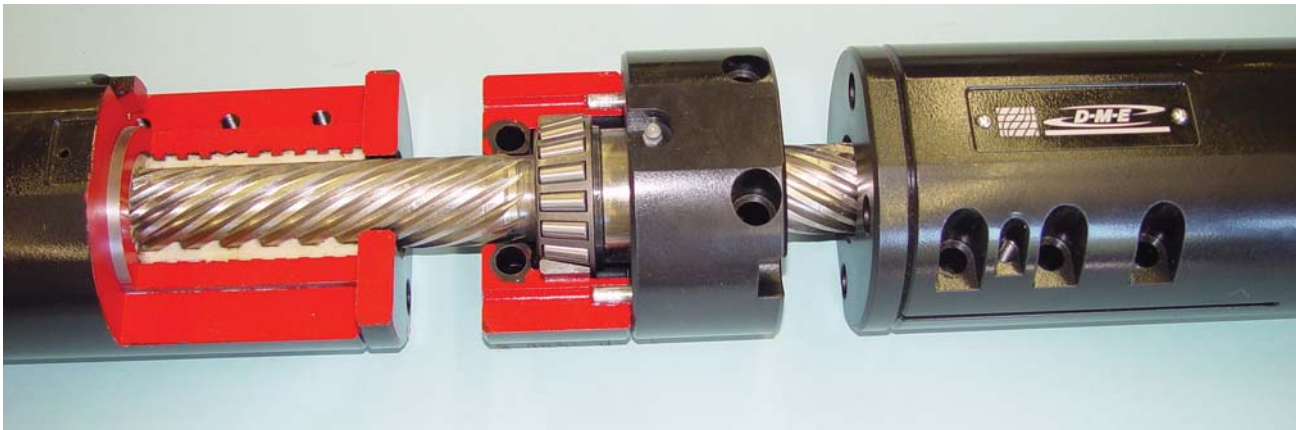
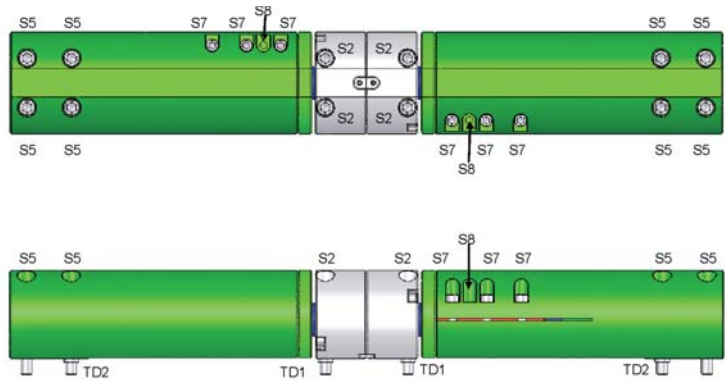
### Helical Gear Stack Mold Centering Devices

#### Assembly and Initial Setup

The Bearing Housings and Nut Housings are pre-assembled at D-M-E assuming equal moving and stationary side stack heights, and symmetric mounting configurations.

The outer ring of the Tapered Roller Bearing is ground to be within the required tolerance, and D-M-E maintains a record of the final dimension.

After installation, the Bearing Housing is filled with grease for proper lubrication.



# SECTION D

## On-Site Setup and Adjustment

### Helical Gear Stack Mold Centering Devices

## On-Site Setup and Adjustment

The final adjustment needs to be done when the HGSM devices are first mounted on the mold. One assembly contains two Nut Housings with Nuts that are usually mounted on the two “B” halves, and the Bearing Housings with the double-ended Helical Gear Shaft that is mounted on the floating center portion of the mold.

The sequence of steps is as follows:

### Step 1

**Note:** The gaps between each Nut Housing End Cap and the Bearing Housing are usually not sufficiently equal to mount and use the Centering Devices without final adjustment. Some adjustment of the gaps between the Nut Housing and Bearing Housing to allow proper mounting should be expected.

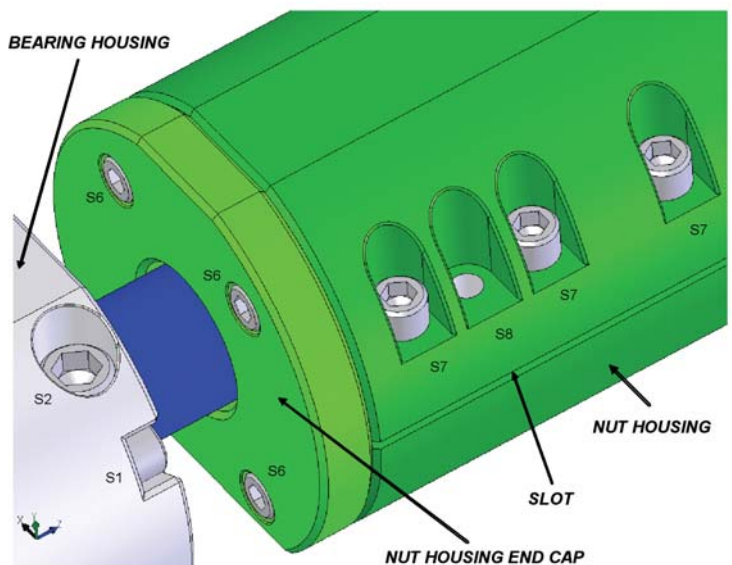
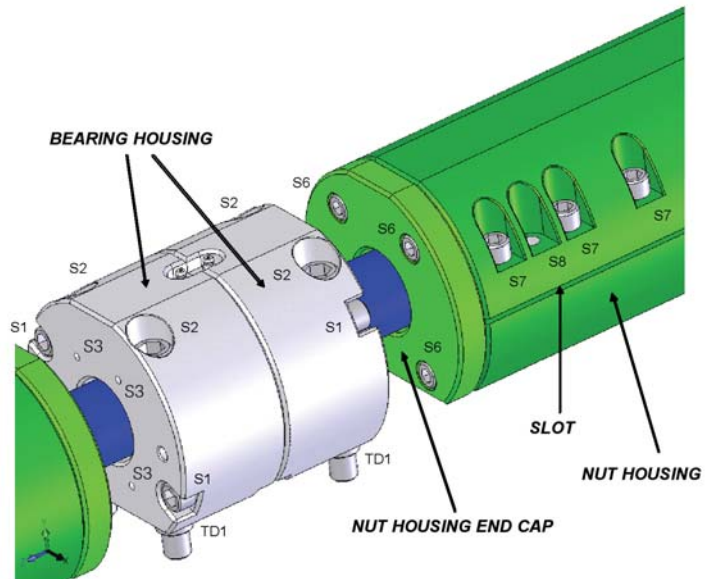
### Step 2

On each assembly, make sure that on one Nut Housing, all four S6 and three S7 screws are tightened to the prescribed torque (see assembly drawing). These screws should remain tight during the adjustment process.

On the other Nut Housing of each assembly, loosen the four S6 screws and remove the three S7 screws. Insert one of the S7 screws into the S8 jacking screw hole between the first and second S7 screw position from the Nut Housing End Cap. Turn the S7 screw until the Slot on the side of the Nut Housing slightly opens, so the Nut can freely rotate but is still retained by the End Cap.

### Step 3

Open the mold to have approximately 50mm parting line opening on each side.



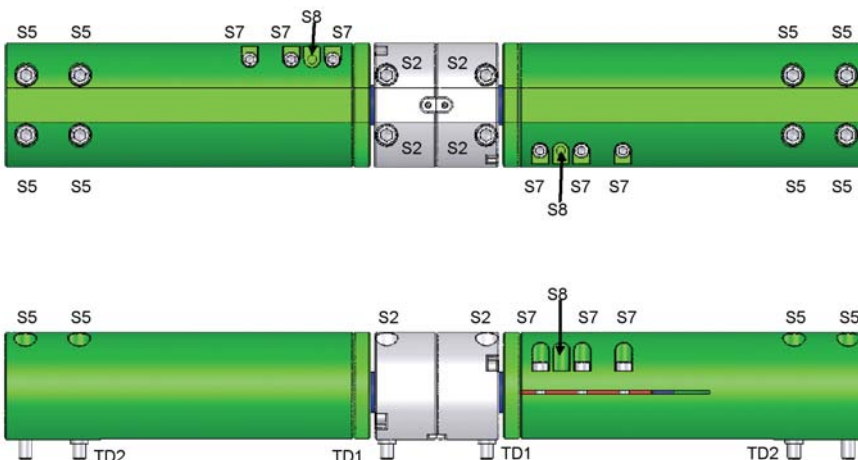
# SECTION D

## On-Site Setup and Adjustment

### Helical Gear Stack Mold Centering Devices

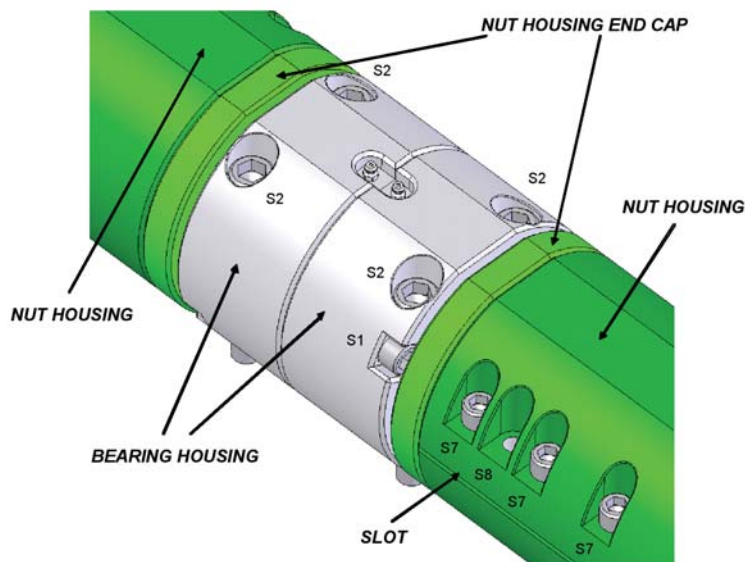
#### Step 4

While the Helical Gear Stack Mold is engaged in the Nuts, mount the Bearing Housings and the Nut Housings (which already have tightened S6 and S7 screws) onto the mold by using four S2 screws and four TD1 tubular dowels per Bearing Housing, and four S5 screws and two TD2 tubular dowels per Nut Housing. See “Handling the Helical Gear Stack Mold Centering Device” for usage of the supplied Alignment Rods to align the assembly during mounting to the mold.



#### Step 5

Pull or push the other Nut Housing with the loose S6 screws and one S7 jacking screw in the direction of the Helical Gear Stack Mold until its mounting holes align with the mounting holes of the corresponding “B” half. **(Note:** The Nut now should freely rotate to self-align to the proper orientation.) Mount this Nut Housing on the mold using four S5 screws and two TD2 tubular dowels.

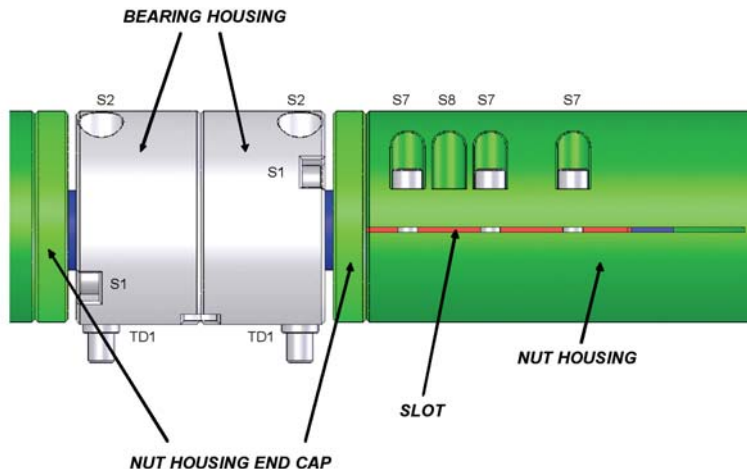


#### Step 6

Repeat the previous steps with all assemblies.

#### Step 7

Close the mold, remove the S7 screw used as a jacking screw, and insert all three S7 screws into their counterbore, then tighten them to the prescribed torque per each assembly.



## SECTION D On-Site Setup and Adjustment

### Helical Gear Stack Mold Centering Devices

#### Step 8

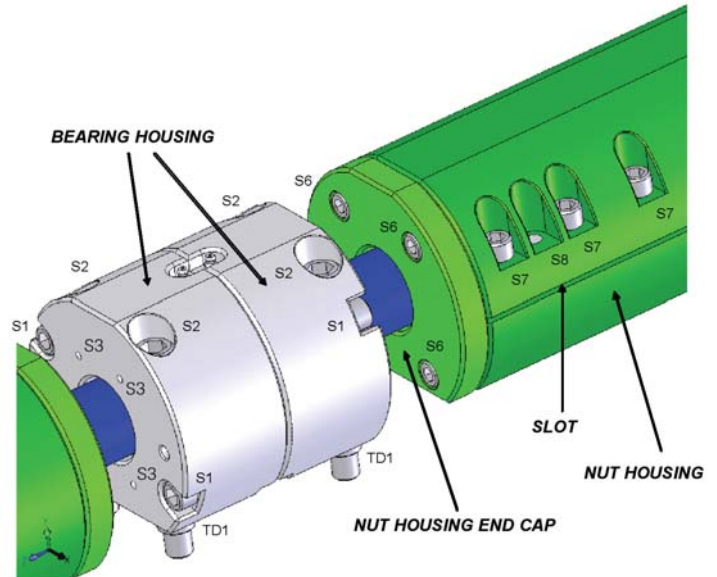
Open the mold again slowly to approximately 50mm per parting line, so the loose S6 screws are accessible. Tighten the S6 screws to the prescribed torque.

#### Step 9

Dry cycle the mold while observing the maximum parting line opening shown in the drawing. The Helical Gear Stack Mold disengages from the Nylon Nut, and breakage may occur if the noted maximum parting line opening is exceeded. During dry cycling of the mold, pay close attention whether the mold operates smoothly and without any cocking. Repeat the previously described setup procedure if it is needed. Notify D-M-E if any problem persists.

#### Step 10

D-M-E provides three Grease Nipples on each Bearing Housing: front, top and bottom, so at least one of them should be easily accessible even when the Centering Device is installed behind the tie bars or other equipment.



# SECTION E

## Disassembly and Replacing Components

### Helical Gear Stack Mold Centering Devices

## Disassembly and Replacing Components

The Helical Gear Stack Mold Centering Device has components that wear during usage. The frequency between replacing these components depends on the number of cycles, the level of maintenance, mold alignment, and other environmental factors such as humidity and contamination.

**Replacing the Nylon Nuts:** The Nylon Nuts are designed to be the wear item in the Helical Gear Stack Mold Centering Device. Slack between the parting line openings is a visual indicator of worn Nylon Nuts.

In addition to the wear items, the Nylon Nuts are also designed to be the preferred failure point in the case of catastrophic failure or seizing during mold operation. For these reasons, D-M-E recommends keeping at least one full set of Nylon Nuts as spare parts.

The Nylon Nuts may be replaced while the mold remains in the press, but it's necessary to unmount the entire Helical Gear Stack Mold Centering Device assembly with the worn Nylon Nut from the mold, and do the replacement on the bench.

D-M-E recommends replacing all Nylon Nuts at the same time, because the amount of wear is usually similar on all of them, and downtime can be spared if all replacements take place at the same time.

To remove the worn Nylon Nut, remove the four S6 screws that hold the Nut Housing End Cap. Remove the three S7 screws, insert one of them into the S8 jacking hole, and turn it until the gap on the side of the Nut Housing opens slightly, so the Nylon Nut is free from the frictional force and can move freely. Pull the Nut Housing while the Helical Gear Shaft does not turn, so the Nut can be pulled out of the Nut Housing.

After cleaning the inside of the Nut Housing of any contamination, the new Nylon Nut can be installed while the one S7 screw is still keeping the Slot slightly open. When the

Nylon Nut bottoms out in the Nut Housing, install the Nut Housing End Cap, but leave the S6 screws only hand tight. Leave the S7 screw in the S8 jacking position.

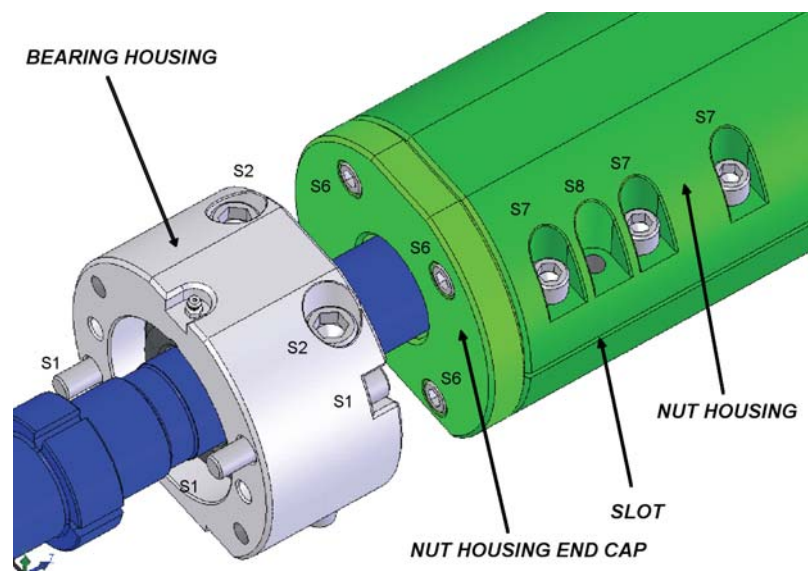
Follow the steps from Step 3 through Step 10 of Section D to mount and set up the proper timing of the Helical Gear Stack Mold Centering Devices.

### Replacing the Taper Roller Bearing:

If the Taper Roller Bearing needs to be replaced, first contact D-M-E to get the final, no-preload thickness of the Bearing, and grind the thicker side of the outer ring so the assembled Bearing has the given thickness.

Unmount the assembly from the mold. Pull the Bearing Housings off the Helical Gear Shaft. Remove the S1 screws, and using the four M6 tapped jacking screw holes per side in the Bearing Housing marked S3 (locations are shown on pages 7 and 9), insert and turn four M6 screws per side until one Bearing Housing is pushed off the outer ring of the Taper Roller Bearing. Do the same with the other side, too.

Using the four Slots of the shoulder of the Helical Gear shaft, push the inner rings of the Tapered Roller Bearings off the shaft.



Questions? Call D-M-E at 1-800-626-6653 (U.S.) or 1-800-387-6600 (Canada)

## SECTION F Regular Maintenance

### Helical Gear Stack Mold Centering Devices

## Regular Maintenance

There are two areas that need to be regularly maintained:

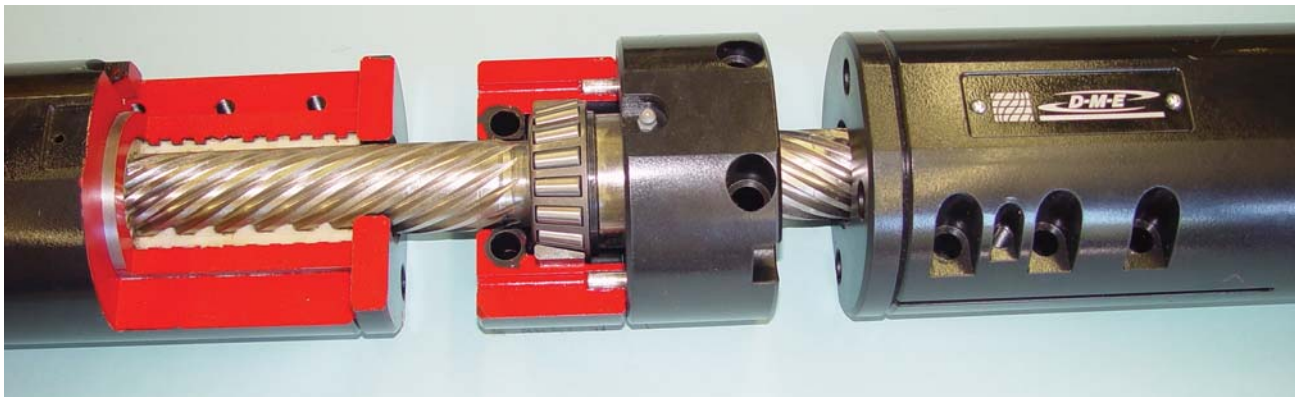
### 1. Taper Roller Bearings

There are two Bearing Housings per assembly. They are screwed together with the two Taper Roller Bearings inside that capture the shoulder of the Helical Gear Shaft. Once a week, use a grease gun to push one unit of grease into each of the Bearing Housings through one of the three Grease Nipples per Bearing Housing. Do the same for all of the assemblies.

**Note:** Each assembly has two Bearing Housings screwed together, so two nipples per assembly need to be used to grease the Taper Roller Bearings.

### 2. Helical Gear Shaft and Nut

The contamination that can come from the surrounding equipment, machines, tools, etc. (such as grease, oil, or residue from the inserted Nylon Nut), could stick to the Shaft and the Nut. This contamination could be transferred to the plastic parts and it can also accelerate the natural wear process. To prevent or slow these processes, clean the surfaces at regular intervals.





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