

# Section 16 - Melt-Cube System

## MeltCUBE

### Introduction

We would like to take this opportunity to thank you for purchasing a *Mold-Masters* Melt-Cube system. The purpose of this manual is to assist users in the integration, operation and maintenance of *Mold-Masters* systems. This manual is designed to cover most system configurations. For additional information, please contact your representative or a *Mold-Masters* office.

### Safety

Please see Section 3 for important safety information.

The responsibility for the safety of personnel remains exclusively with the employer. It is the obligation of the employer to properly train and instruct its personnel in the safe operation of equipment including maintenance and the purpose and proper use of all the safety devices. In addition, the employer must provide its personnel with all necessary protective clothing, including such items as a face shield and heat resistant gloves. Any instructional material provided by *Mold-Masters* for the operation and maintenance of equipment, does not in any way absolve the employer from fulfilling these obligations and *Mold-Masters* disclaims liability for injury to personnel using equipment supplied.

### Notices

Notices throughout this manual indicate additional information that must be performed or observed.



#### **WARNING**

Safety warning indicates a potentially hazardous situation, which if not avoided, could result in serious injury or death.



#### **CAUTION**

Caution indicates that damage to equipment is possible.



#### **NOTE**

Important indicates useful additional information or is used as a reminder for important information.

## Melt-Cube Components

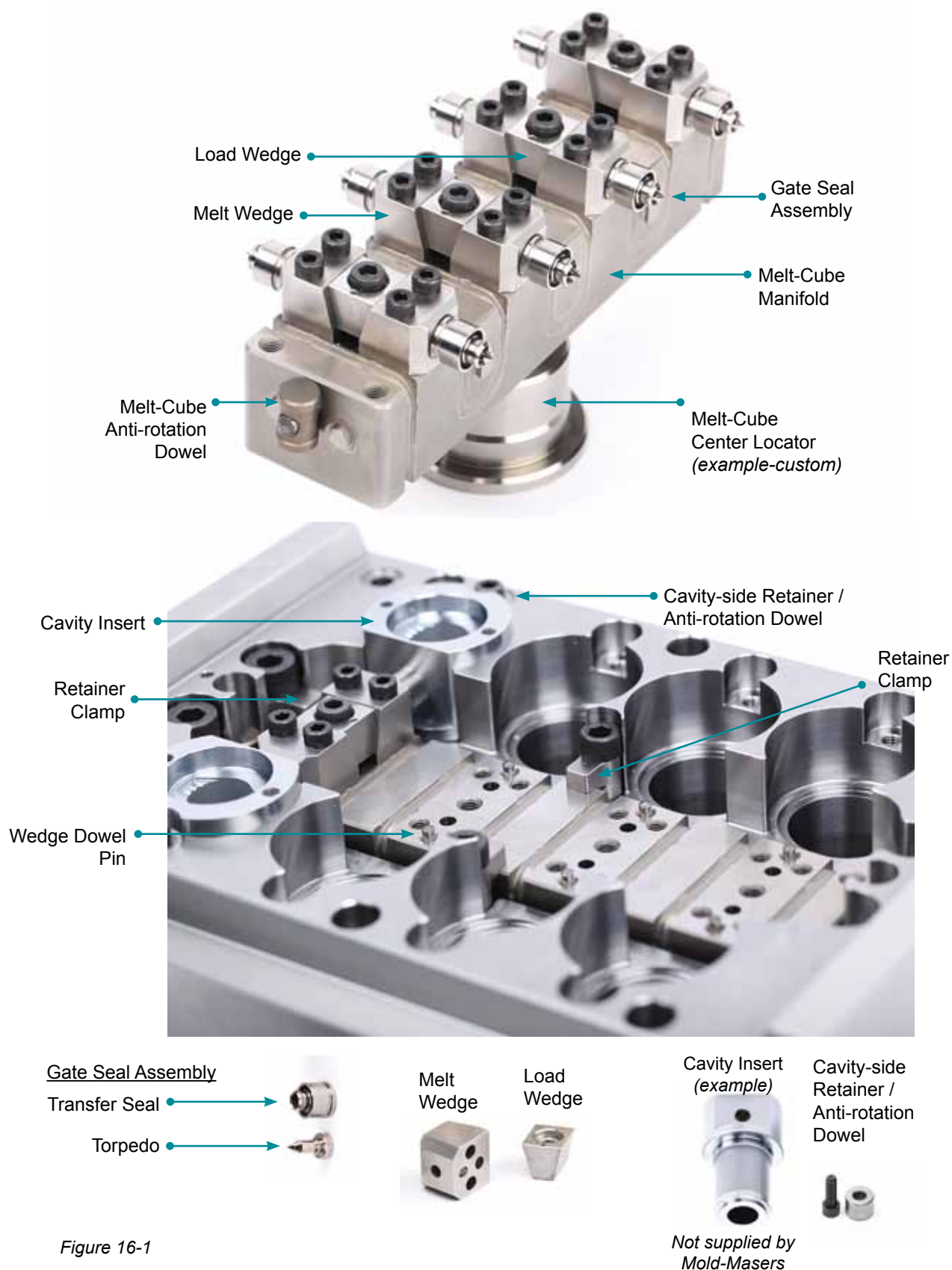


Figure 16-1

## Example Melt-Cube System

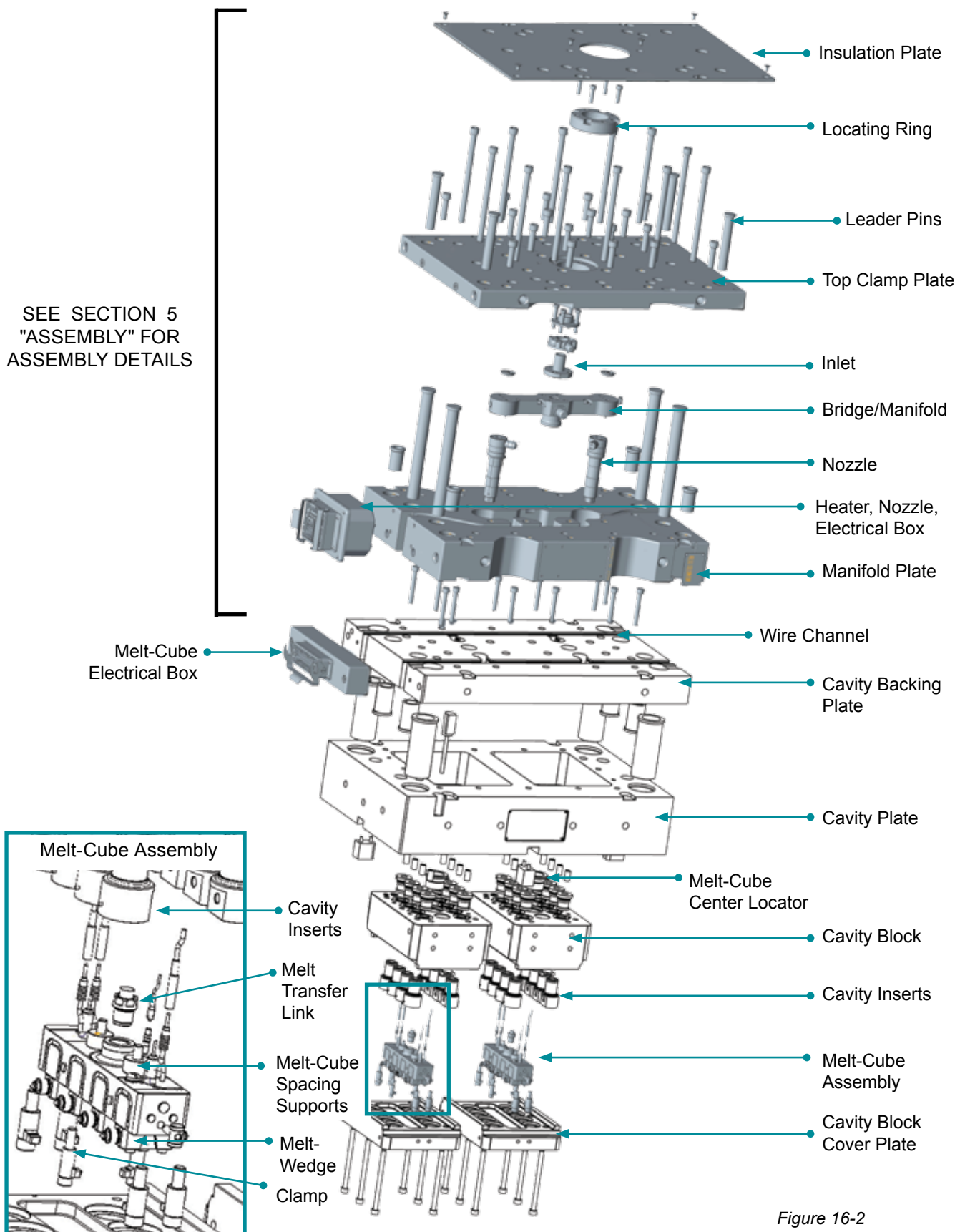


Figure 16-2

## Preparation

### Inspection

1. Inspect critical dimensions for cavity cutout to ensure it matches the GA drawing and catalogue pages.

### Clean Melt-Cube

1. Wipe down the Melt-Cube.
2. If necessary, use a cotton swab to clean narrow interior surfaces or screw threads. For larger surfaces, such as the manifold, use thinner in spray form to clean channels and recesses.

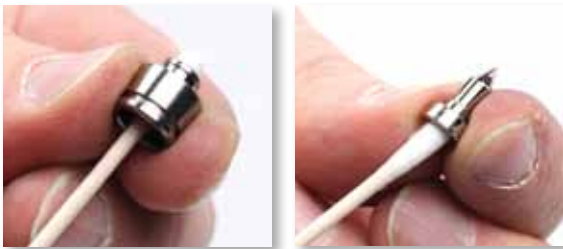


Figure 16-3

### Assemble Melt-Cube Thermocouple

1. Insert the thermocouple tip into the thermocouple hole. Thermocouple must bottom out in the hole.



Figure 16-4

2. Bend the thermocouple back 90° to sit in the manifold channel.
3. Apply anti-seize to the retaining screw. Secure the thermocouple with the screw.



Figure 16-5

### Assemble Ground Wire

1. Apply anti-seize to the retaining screw. Secure the ground wire with the screw.

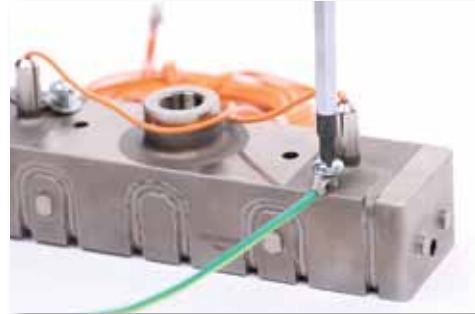


Figure 16-6

### Assemble Melt Transfer Link to Melt-Cube

1. Anti-seize the threads of the Melt Transfer Link (Top half and bottom half).



Figure 16-7

2. Thread the Melt Transfer Link bottom half into the Melt-Cube and the Melt Transfer Link top half into the nozzle.



Figure 16-8

3. Torque the Melt Transfer Link COLD to the value specified in the torque chart (see Figure 16-15) or the general assembly diagram.



## Assemble Melt-Cube into Cavity Block

If the system has been running:

1. Make sure water to the cover plate is off, then remove the cover plate.
2. Turn on cooling to the rest of plates (especially the cavity plates).



### NOTE

Mold-Masters recommends a separate cooling circuit for the cover plate to be able to assemble and disassemble it without affecting other cooling circuits.

### Melt-Cube Assembly (at cold condition)

Assembly at cold condition, as follows. **Note: For clarity an example 8 cavity demo system is shown.**

1. Install Melt-Cube anti-rotation dowel in each end of the Melt-Cube.



Figure 16-9

2. Install Melt-Cube center locator and spacing supports into the back of the cavity block.
3. Insert Melt-Cube into the cavity block. Align the anti-rotation dowels with the slots in the cavity block, while also aligning the Melt-Cube to the Melt-Cube center locator and spacing supports.



Figure 16-10

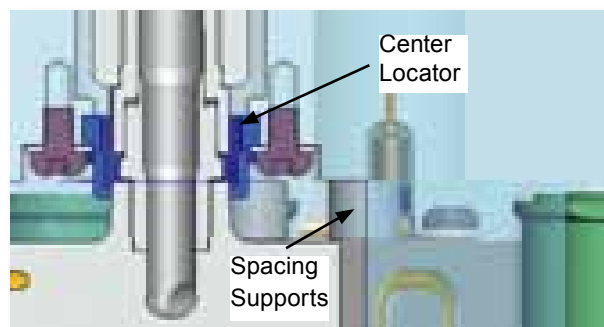


Figure 16-11

4. Apply anti-seize to the clamp SHCS's. Install the proper SHCS into each retainer clamp. Install clamps over Melt-Cube at locations shown in GA drawing. Torque as specified in Clamp Screw Torque Chart (see Figure 16-14).



Figure 16-12

Figure 16-13

### Clamp Screw Torque Chart

SHCS	Component	Torque Value LB-ft (Nm)
M6X35	CLAMP16	7.5 (10)
M8X35	CLAMP17	12 (16)
M8X35	CLAMP18	15 (20)

Figure 16-14

### Melt Transfer Link Torque Chart

Part Number	Description	Torque Value LB-ft (Nm)	Socket Size (mm)
MTL015A	Melt Transfer Link Deci Top Half (to nozzle)	25-28 (34-38)	19
MTL016A	Melt Transfer Link Centi Top Half (to nozzle)	20-22 (27-30)	16
MTL015B	Melt Transfer Link Deci Bottom Half (to Melt-Cube)	20-22 (27-30)	17
MTL016B	Melt Transfer Link Centi Bottom Half (to Melt-Cube)	20-22 (27-30)	15

Figure 16-15

5. Install cavity inserts (if applicable), aligning hole with cavity.



Figure 16-16

6. Install cavity side retainer / anti-rotation dowel using SHCS. Repeat for all cavities.



Figure 16-17

7. Prepare gate seal assembly:
  - a. Ensure transfer seal and torpedo are clean.
  - b. Install torpedo into transfer seal.



Figure 16-18

8. Ensure outside of transfer seal is clean. Slide fit transfer seal into cavity insert hole.



Figure 16-19

9. Install wedge dowel pins for locating melt wedges.



Figure 16-20

10. Ensure all melt wedge surfaces are clean.



Figure 16-21

11. Place melt wedge on pin. Apply anti-seize to two SHCS (M4X20). Insert melt wedge and hand tighten (less than 5 LB-in or 0.56 Nm) until head of screw bottoms. Repeat for opposite cavity melt wedge.



Figure 16-22

12. Install load wedge between melt wedges. Apply anti-seize to SHCS (M5X20) and hand tighten to about 7 LB-in (or 0.79 Nm torque) to make sure all components are in proper contact condition.
13. Then loosen load wedge SHCS one full turn CCW to assure no engagement. Repeat for all load wedges.
14. Once the system is assembled, melt wedge and load wedge screws must be re-tightened at process temperature. See "Retighten Wedge Screws at Hot Condition".

**CAUTION**

Failure to re-tighten wedge screws at process temperature could cause leakage.



Figure 16-23

**Retighten Wedge Screws (at Hot Condition)****CAUTION**

Wedge screws must be tightened once the system is heated to processing temperature. Failure to do so could cause leakage.

**Do not over torque screws.** Use proper torque wrench for LB-in or fraction of Nm scale. Do not use torque wrenches with LB-ft or large scale Nm for tightening the M4 and M5 screws.

1. Set temperature of all hot-runner components to processing temperature according to start up procedure. Make sure all cooling lines other than cover plate are connected properly.
2. After reaching the processing temperature in Melt-Cube let it soak for at least 5 minutes.
3. Tighten the SHCS (M5X20) at the center of load wedge to the proper torque shown in Figure 16-24.

**WARNING**

Potential burn hazard. Use socket extension and heat resistant gloves.

**Load Wedge Screw Torque Chart**

SHCS	Tip Angle (°)	Temperature	Torque Value lb-in (Nm)
M5X20	0°	Process Temp	30 (3.4)
M5X20	15°	Process Temp	29 (3.3)
M5X20	30°	Process Temp	27 (3.1)
M5X20	45°	Process Temp	22 (2.5)
M5X20	60°	Process Temp	16 (1.8)

Figure 16-24

**Melt Wedge Screw Torque Chart**

SHCS	Tip Angle (°)	Temperature	Torque Value lb-in (Nm)
M4X20	All	Process Temp	30 (3.4)

Figure 16-25

**Hot Runner User Manual**

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Electronic version is available at [www.moldmasters.com](http://www.moldmasters.com)



Figure 16-26

4. Tighten all melt wedge SHCS (M4x20) in two stages:
  - a. First tighten all to 15 LB-in (1.69 Nm) torque
  - b. Then tighten all to 30 LB-in (3.38 Nm) torque as shown in Figure 16-25.
5. Assemble cavity block cover plate and connect proper cooling lines.
6. Allow all hot runner components to reach processing temperature.
7. Fill system under low pressure extrude (using screw rotation).
8. Set nozzle temperature 10°F (6°C) lower than melt cube.

**CAUTION**

If the processing temperature is changed by more than 54°F (30°C) then all wedge screws should be loosened at cold condition and the assembly process repeated at cold and process temperature, as explained above.

**Startup and Shutdown****Startup**

1. Heat bridge and inlet to processing temperature.
2. Heat nozzles to processing temperature.
3. Heat Melt-Cube to processing temperature.
4. Allow to heat soak at least 5 minutes.
5. Fill system under low pressure extrude (using screw rotation).
6. Set nozzle temperature 10°F (6°C) lower than Melt-Cube.

**Shutdown**

1. Reduce Melt-Cube temperatures to 300°F (150°C).
2. Reduce Nozzle temperatures to 300°F (150°C).
3. Turn off all zones.



## Maintenance - Replacing a Tip



### WARNING

Potential burn hazard. Use socket extension and heat resistant gloves.



### NOTE

Before shutting down the molding machine and mold, use maximum screw decompression to remove as much molten plastic from the hot runner system as possible.

1. Make sure the Melt-Cube and related nozzle are at the temperature that the plastic is soft enough to be able to detach runners at gate area.
2. Drain water inside cooling lines of the cover plate of the cavities and then remove the cover plate.
3. Loosen and take out the SCHC M5X20 at the center of the load wedge of tip to be replaced.
4. Use SHCS M6X100 in the tool kit to extract required load wedge.



Figure 16-27

5. Loosen and take out the two SCHC M4X20 on the melt wedge.
6. Use the two SHCS M5X100 in the tool kit to extract related melt wedge.



Figure 16-28

7. Let the system cool down to almost room temperature.

8. Take out the transfer seal and related torpedo assembly from the cavity plate. You may use proper pliers with soft tips (brass) and suitable hole or may use screw-drivers with soft tip (brass) to pry transfer seal at the groove close to its wider diameter.



Figure 16-29

9. Clean the parts and interfaces gently and replace needed parts (usually the torpedo).



### CAUTION

The flat sealing interfaces of the removed melt wedges should be treated very gently. Any rough scratch may become a source of leakage.

10. To clean the sealing surfaces of the removed melt wedges, it is recommended to use soft sandpaper (500 grit) placed on a completely flat surface (ground flat surface or proper granite measurement base). Rub the surfaces gently with a few strokes on the sand paper.



Figure 16-30

11. Loosen SHCS on opposite side of the melt wedge to have only 5 lb-in torque, as well.
12. Reassemble following steps in section titled *Melt-Cube Assembly (at cold condition)*. Complete these steps for any two sets of seals that are a mirror of one another and have been loosened (to have balanced forces on interfaces of both sides during reassembly).