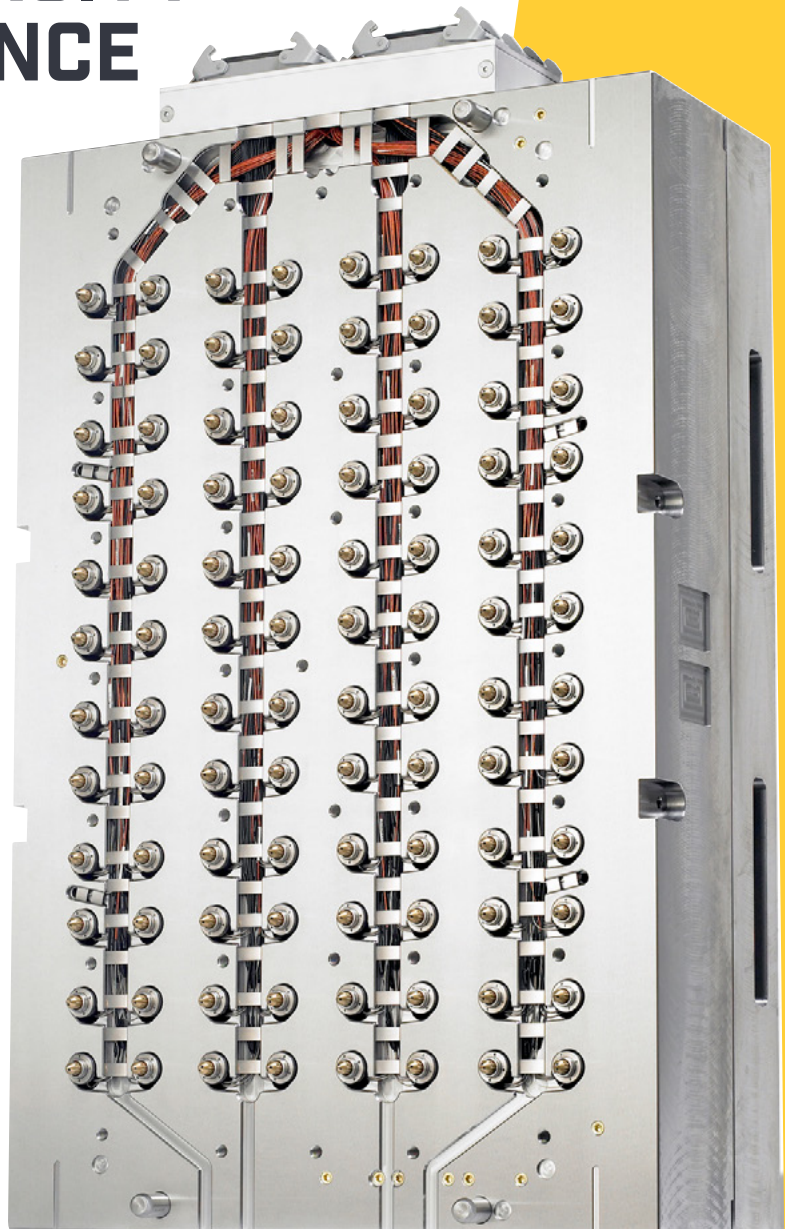


HUSKY®

HOT RUNNER REFURBISHMENT AND MAINTENANCE PROGRAMS

**EXTEND CAPACITY
& PERFORMANCE**



HOT RUNNER REFURBISHMENT AND MAINTENANCE PROGRAMS EXTEND CAPACITY AND PERFORMANCE

While many molders have strict maintenance programs for their molds, some look at their hot runner systems as a mystery and better left untouched. Hot runner melt delivery and management is just as critical to molding productivity as the cavity, cores, and cooling, so why not apply the same discipline and critical evaluation when it comes to melt delivery?

Continually inspecting and maintaining your hot runner system ensures that it constantly operates at peak performance. In addition to maintenance, system refurbishment can also be done depending on the condition of the system.

MOLDERS CAN IMPLEMENT A VARIETY OF REFURBISHMENT MEASURES THAT DELIVER A RANGE OF BENEFITS INCLUDING:



RESET OF MELT DELIVERY TO 100% CAVITATION



ASSURANCE OF HIGHEST PART QUALITY AND OUTPUT



CONFIDENCE IN INCREASED UPTIME AND OPERATING LIFE



MUCH LOWER COST THAN OUTRIGHT REPLACEMENT

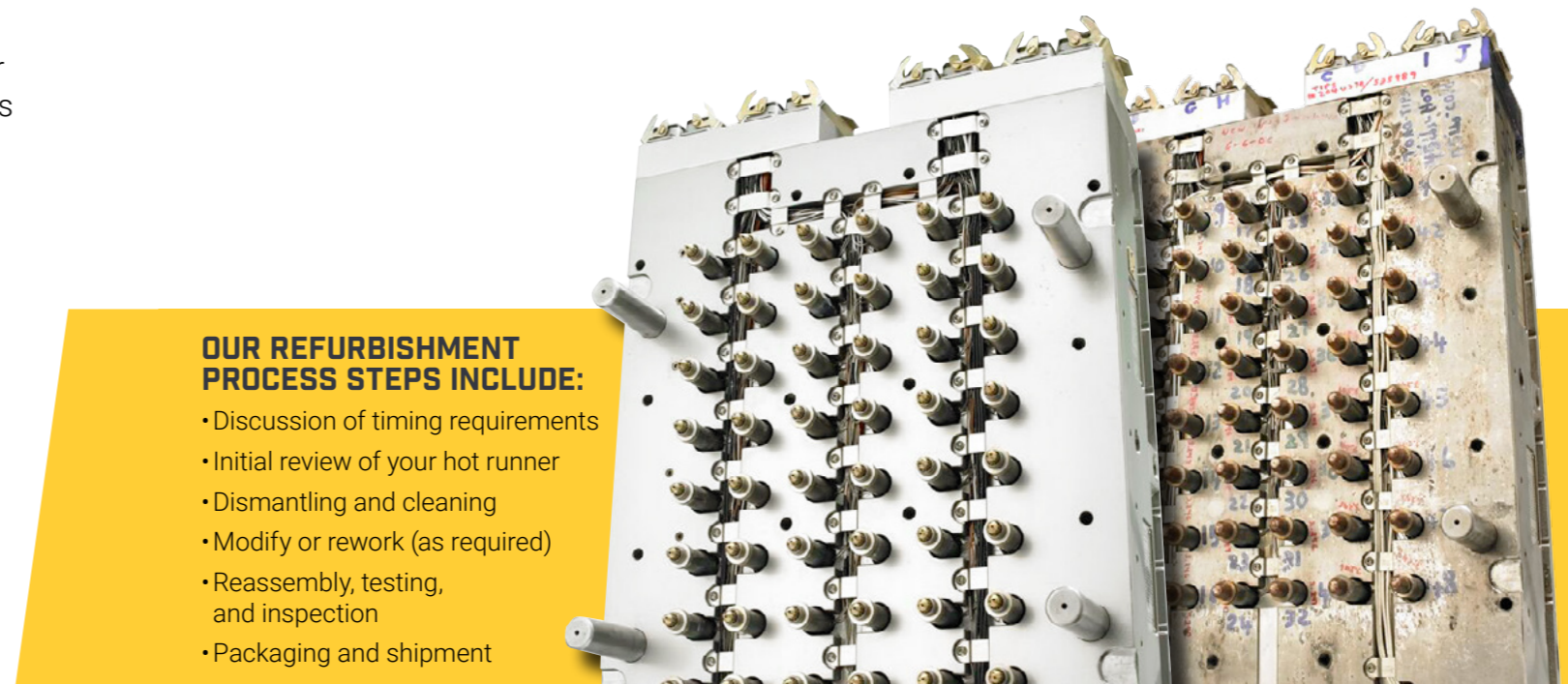


OPPORTUNITY TO IMPLEMENT NEW TECHNOLOGIES OR CONVERSIONS

Hot runner refurbishment or maintenance programs can refresh or replace wear items in the assembly with genuine Husky replacement parts. Inspection of key features of the hot runner ensures that bore depths and preload are still within tolerance, and tip and stem heights meet criteria needed for proper mold interface. Upon completion of assembly, the hot runner is heat-tested to confirm all heaters and thermocouples work as required. All work is performed by highly trained Husky technicians.

Refurbishment ensures that the hot runner operates at maximum performance with the longest possible operating time, until a process modification is needed to account for performance. Greater confidence in the hot runner system helps the entire molding system achieve 100% cavitation with maximum possible output and quality, while also reapplying Husky's three-year leakproof guarantee when a Platinum rebuild is completed.

ALL REFURBISHMENT WORK IS COMPLETED BY TRAINED HUSKY EXPERTS



OUR REFURBISHMENT PROCESS STEPS INCLUDE:

- Discussion of timing requirements
- Initial review of your hot runner
- Dismantling and cleaning
- Modify or rework (as required)
- Reassembly, testing, and inspection
- Packaging and shipment

A range of service tiers are available to meet cost and timing requirements. These range from a platinum-level cleaning with full rebuild including all new components and full inspection, to a basic-level cleaning where all parts are re-used at reassembly.

Open communication throughout the refurbishment program is an important part of the process. We issue progress reports and provide updates and changes along the way. Upon completion, Husky supplies a final inspection report of the hot runner. Root cause analysis and troubleshooting is conducted upon request.

Refurbishment is not limited to recently-purchased hot runners. Husky has been a leading manufacturer of hot runners for more than 50 years, and complements its offering with extensive rebuilding services.

Conversions are also an excellent time for refurbishment. In some cases, a single-faced hot runner or mold is reconfigured to operate as a stack mold. In other instances, the nozzles are replaced to accommodate a new "L" dimension or nozzle protrusion spec, preloads are adjusted, manifolds modified to accommodate a different resin, or old nozzle tips converted to utilize modern designs.

After refurbishment, the hot runner is returned in "as-new" condition with documentation outlining all inspection, work details, and replacements. Molders can have complete confidence that the upgraded melt delivery system will return the injection molding line to its peak operating level.

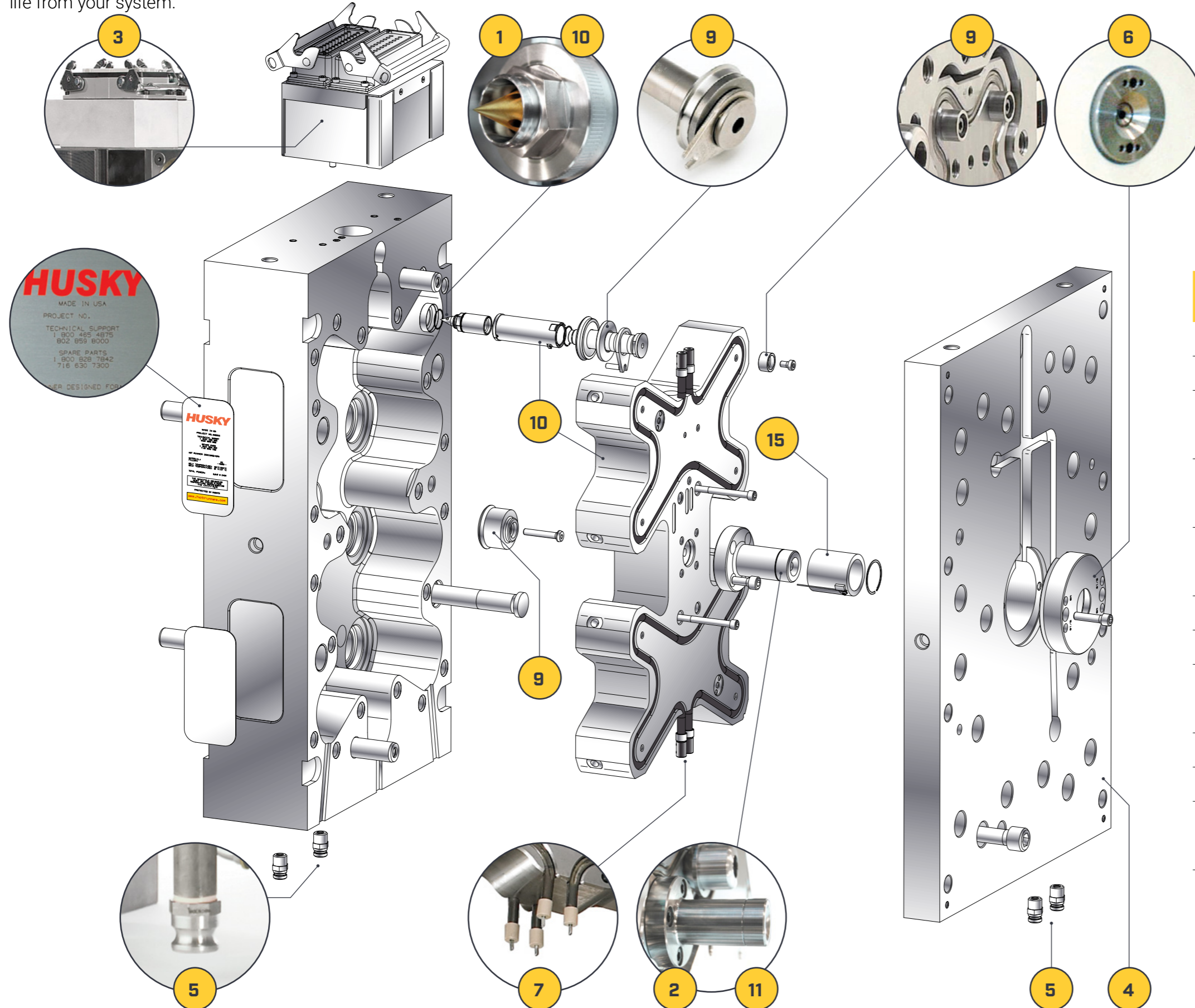


SEVERAL STEPS ARE INVOLVED TO ENSURE A HOT RUNNER OPERATES LIKE NEW

TYPICAL HOT RUNNER MAINTENANCE RECOMMENDATIONS

HOT TIP SYSTEMS

Whether it is a full refurbishment program or a standard maintenance package, Husky's expert hot runner team can recommend the best approach to secure the most value, performance, and service life from your system.

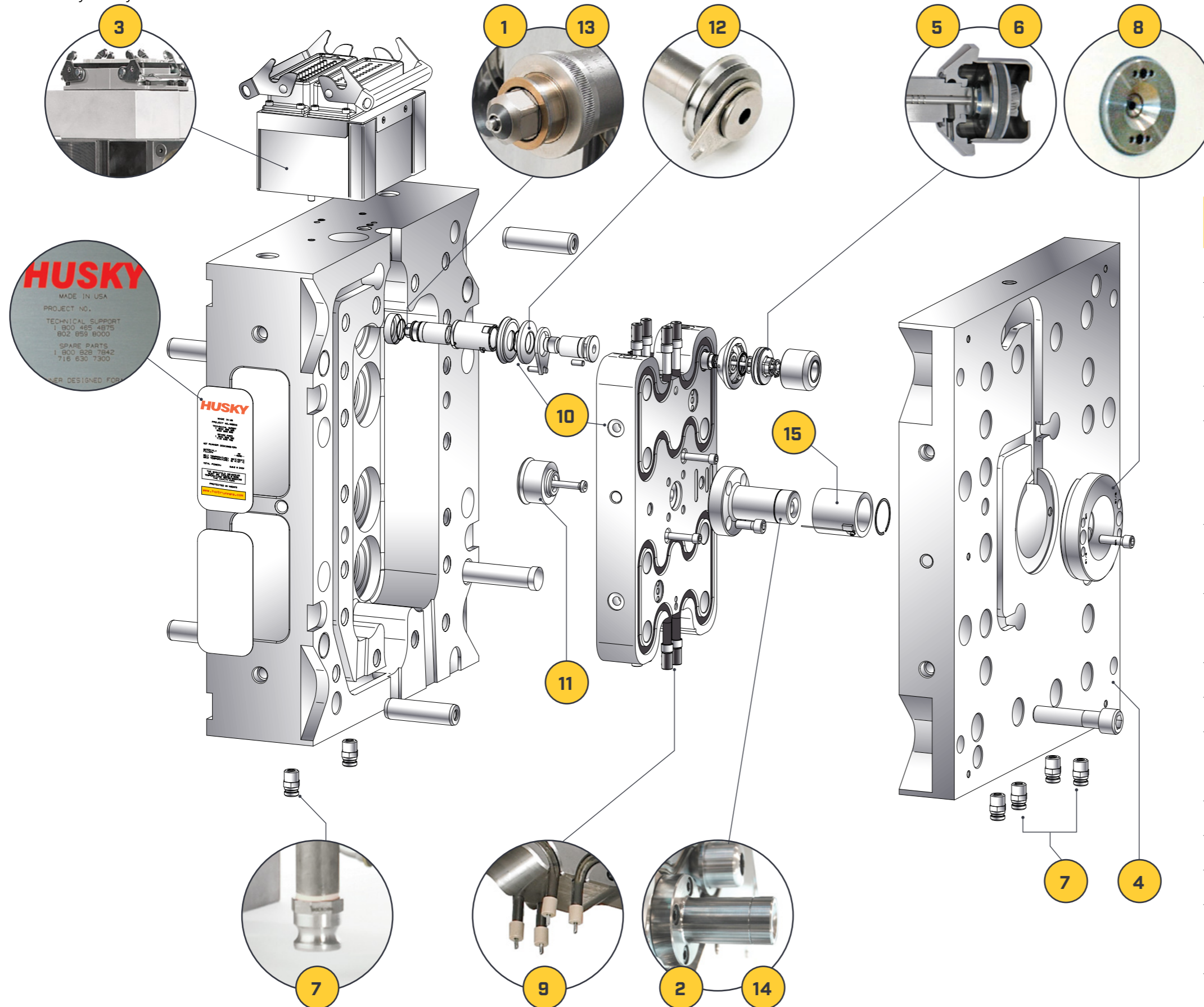


Item	Maintenance Task	6 Months	1 Year	3 - 4 Years
1	Clean and visually inspect nozzle tip insert, tip retainer seal-off diameter and tip insulator	•		
2	Clean and visually inspect sprue bushing	•		
3	Perform a meter check on all electrical components	•		
	Verify electrical readings to electrical schematic	•		
4	Remove manifold backing plate		•	
	Visually inspect for plastic leakage		•	
5	Remove water fittings and check for corrosion deposits within channels		•	
	Analyze water if necessary		•	
6	Clean and visually inspect locating ring		•	
7	Inspect manifold heater and heater insulation		•	
8	Remove manifolds and nozzle stacks from plates			•
	Clean and inspect melt channels			•
9	Replace center locating insulator, nozzle disc springs and back-up pads			•
10	Replace nozzle tip inserts, tip retainers and tip insulators			•
11	Remove sprue bushing			•
	Clean melt channel and rework spherical radius			•
12	Replace sprue heater and thermocouple			•

TYPICAL HOT RUNNER MAINTENANCE RECOMMENDATIONS

VALVE GATE SYSTEMS

Whether it is a full refurbishment program or a standard maintenance package, Husky's expert hot runner team can recommend the best approach to secure the most value, performance, and service life from your system.



Item	Maintenance Task	6 Months	1 Year	3 - 4 Years
1	Clean and visually inspect nozzle tip retainer, tip insulator and valve stem	•		
2	Clean and visually inspect sprue bushing	•		
3	Perform a meter check on all electrical components	•		
	Verify electrical readings to electrical schematic	•		
4	Remove manifold backing plate	•		
5	Clean plastic leakage around valve gate back up pad / manifold surface	•		
	Remove valve gate cylinder and piston assembly	•		
6	Clean and visually inspect air sealing surfaces	•		
	Clean and inspect valve gate piston		•	
7	Replace valve gate piston seal		•	
	Remove water fittings and check for corrosion deposits within channels		•	
8	Analyze water if necessary		•	
	Clean and visually inspect locating ring		•	
9	Inspect manifold heater and heater insulation		•	
10	Remove manifolds and nozzle stacks from plates			•
	Clean and inspect melt channels			•
11	Replace center locating insulator			•
12	Replace nozzle disc spring and back-up pad			•
13	Replace nozzle tip retainer, tip insulator and valve stem			•
14	Remove sprue bushing			•
	Clean melt channel and rework spherical radius			•
15	Replace sprue heater and thermocouple			•

HOT RUNNER REFURBISHMENT SERVICES FOR HOT RUNNER SYSTEMS (INCLUDING PLATES)

HUSKY HOT RUNNER REFURBISHMENT SERVICES				
Services	Platinum Package Rebuild	Gold Package Cleaing/ Inspection	Silver Package Cleaning/Inspection	Bronze Level Cleaning
Full disassembly	✓	✓	✓	✓
Fluidized bed cleaning (manifold)	✓	✓	✓	✓
Fluidized bed cleaning (parts)	✓	✓	✓	✓
Inspection of manifold	✓	✓	✓	N/A
Inspection of components	N/A	✓	✓	N/A
Melt channel cleaning	✓	✓	✓	✓
Melt channel bore scope inspection	✓	✓	✓	N/A
Melt channel extrude hone & wash	✓	✓	✓	✓
Heat test	✓	✓	✓	✓
Air leakage test	✓	✓	✓	✓
Rework Components (if applicable)	Platinum Package Rebuild	Gold Package Cleaing/ Inspection	Silver Package Cleaning/Inspection	Bronze Level Cleaning
Backing plate grind & jig bore	✓	N/A	N/A	N/A
Manifold plate grind & jig bore	✓	N/A	N/A	N/A
All manifolds grind & jig bore	✓	N/A	N/A	N/A
Warranty and Coverage	Platinum Package Rebuild	Gold Package Cleaing/ Inspection	Silver Package Cleaning/Inspection	Bronze Level Cleaning
3-year Leak-proof Warranty	✓	N/A	N/A	N/A
6-months parts workmanship	✓	✓	✓	N/A
HOT RUNNER REFURBISHMENT REPLACEMENT PARTS				
Components	Platinum Package Rebuild	Gold Package Cleaing/ Inspection	Silver Package Cleaning/Inspection	Bronze Level Cleaning
VG piston seal	✓	✓	✓	N/A
VG grafoil seal	✓	✓	✓	N/A
VG crush ring (if applicable)	✓	✓	✓	N/A
VG cylinder	✓	✓	N/A	N/A
Nozzle tip insulator	✓	✓	✓	N/A
Nozzle tip	✓	✓	N/A	N/A
Valve stem	✓	✓	N/A	N/A
Nozzle housing	✓	N/A	N/A	N/A
Nozzle heater	✓	✓	N/A	N/A
Nozzle thermocouple	✓	✓	✓*	N/A
Nozzle heater front ring	✓	✓	✓	N/A
Nozzle disc spring/ spring pack	✓	✓	✓	N/A
Nozzle locating insulator (Ultra)	✓	N/A	N/A	N/A
Anti-rotation ring (Ultra)	✓	N/A	N/A	N/A
HT back up insulator pad	✓	✓*	✓*	N/A
VG back up Insulator	✓	✓*	✓*	N/A
VG piston	✓	N/A	N/A	N/A
VG piston spacer	✓	N/A	N/A	N/A
Manifold bushing	✓	N/A	N/A	N/A
Manifold heater	✓	N/A	N/A	N/A
Manifold thermocouple	✓	✓	N/A	N/A
Manifold compression disc	✓	✓	N/A	N/A
Manifold spring pack	✓	✓	N/A	N/A
Center locating insulator	✓	✓	N/A	N/A
Sprue heater	✓	N/A	N/A	N/A
Sprue thermocouple	✓	✓*	N/A	N/A
Sprue bushing	✓	N/A	N/A	N/A
Locating ring	✓	N/A	N/A	N/A
Guide pin	✓	N/A	N/A	N/A
Electrical base	✓	N/A	N/A	N/A
Electrical connector	✓	N/A	N/A	N/A

* Only replaced if damaged
 ** Only supplied if full nozzle stack is returned with system
 Platinum refurb requires plates to be sent in

HOT RUNNER REFURBISHMENT SERVICES FOR MANIFOLD ONLY SYSTEMS

HUSKY HOT RUNNER REFURBISHMENT SERVICES			
Services	Gold Package Cleaing/ Inspection	Silver Package Manifold Cleaning/Inspection	Bronze Level Cleaning
Full disassembly	✓	✓	✓
Fluidized bed cleaning (manifold)	✓	✓	✓
Fluidized bed cleaning (parts)	✓	✓	✓
Inspection of manifold	✓	✓	N/A
Inspection of components	✓	✓	N/A
Melt channel cleaning	✓	✓	✓
Melt channel bore scope inspection	✓	✓	N/A
Melt channel extrude hone & wash	✓	✓	✓
Heat test	N/A	N/A	N/A
Air leakage test	N/A	N/A	N/A
Rework Components (if applicable)	Gold Package Cleaing/ Inspection	Silver Package Manifold Cleaning/Inspection	Bronze Level Cleaning
Backing plate grind & jig bore	N/A	N/A	N/A
Manifold plate grind & jig bore	N/A	N/A	N/A
All manifolds grind & jig bore	N/A	N/A	N/A
Warranty and Coverage	Gold Package Cleaing/ Inspection	Silver Package Manifold Cleaning/Inspection	Bronze Level Cleaning
3-year Leak-proof Warranty	N/A	N/A	N/A
6-months parts workmanship	✓	✓	N/A
HOT RUNNER REFURBISHMENT REPLACEMENT PARTS			
Components	Gold Package Cleaing/ Inspection	Silver Package Manifold Cleaning/Inspection	Bronze Level Cleaning
VG piston seal	✓	✓**	N/A
VG grafoil seal	✓	✓**	N/A
VG crush ring (if applicable)	✓	✓**	N/A
VG cylinder	✓	N/A	N/A
Nozzle tip insulator	✓	✓**	N/A
Nozzle tip	✓	N/A	N/A
Valve stem	✓	N/A	N/A
Nozzle housing	N/A	N/A	N/A
Nozzle heater	✓	N/A	N/A
Nozzle thermocouple	✓	N/A	N/A
Nozzle heater front ring	✓	N/A	N/A
Nozzle disc spring/ spring pack	✓	✓	N/A
Nozzle locating insulator (Ultra)	N/A	N/A	N/A
Anti-rotation ring (Ultra)	N/A	N/A	N/A
HT back up insulator pad	✓*	✓*	N/A
VG back up Insulator	✓*	✓*	N/A
VG piston	N/A	N/A	N/A
VG piston spacer	N/A	N/A	N/A
Manifold bushing	N/A	N/A	N/A
Manifold heater	N/A	N/A	N/A
Manifold thermocouple	✓	N/A	N/A
Manifold compression disc	✓	N/A	N/A
Manifold spring pack	✓	N/A	N/A
Center locating insulator	✓	N/A	N/A
Sprue heater	N/A	N/A	N/A
Sprue thermocouple	✓*	N/A	N/A
Sprue bushing	N/A	N/A	N/A
Locating ring	N/A	N/A	N/A
Guide pin	N/A	N/A	N/A
Electrical base	N/A	N/A	N/A
Electrical connector	N/A	N/A	N/A

* Only replaced if damaged
 ** Only supplied if full nozzle stack is returned with system
 Platinum refurb requires plates to be sent in

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