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	Document #: EQP-019B	Revision: 1.0	Effective Date: 29-Jul-2019
	Title: Quarterly Freezer Preventive Maintenance Checklist		

GRIFOLS

Preventive Maintenance (PM) must be performed at regular quarterly intervals. This requirement covers the freezer compartment(s) as well as the anteroom, if applicable. Freezers are to be shut down on a rotating basis at quarterly PMs. The freezer that is scheduled for a full PM service, in which the freezer is shut down, should be emptied of product the day before by donor center staff. This allows all aspects of the PM to be completed. During quarters where a shutdown is not required, product may remain in the freezer as long as the PM does not impact the product that is stored in the freezer. PMs are to be scheduled a minimum of three weeks in advance to coordinate with normal product shipping schedules.

Each freezer and anteroom requires its own form to be completed, i.e., a center with two freezers and one anteroom would complete three forms.

Do not make any changes to the system settings or set points on freezing systems without prior approval from the Manager, GPO Facilities Engineering. Contractors must contact the refrigeration group before making any changes, so that validation impact of the change can be assessed.

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Location Freezer ID Date Initiated

Was this freezer / anteroom empty of all product and shut down for cleaning and service? Yes No

Freezer Box					
Manufacturer Serial #		Model #			
			Yes	No	N/A
1.	Are the door locks in good repair, without field modifications, and fully functional? If no, have they been immediately repaired or replaced?				
2.	Is freezer door safety mechanism functioning properly? If not, repair immediately. (If applicable) If safety mechanism is not functioning properly and cannot be immediately repaired, did you inform center staff and schedule repair?				
3.	Are plastic strip curtains in place and in good repair for all exterior doors, including walk-thru and pass-thru door? Replace as necessary with -70°C rated strips.				
4.	Are all heated frames on the doors and port openings working? Repair as necessary.				
5.	Are all lights, including pilot light inside freezer functional? Repair as necessary.				
6.	Is area free of exposed wiring, non-grounded equipment or other electrical hazards, e.g., temp probes, control and power wiring, conduit, etc.?				
7.	Are defrost drain line heaters functioning properly? Repair heat tape as necessary.				
8.	Are all door seals / gaskets, closures, latches, and handles free from air leakage / frost buildup or damage?				
9.	Are all panel joints (floor, walls & ceiling) free from large gaps, damage, or delaminating?				
10.	Are all electrical, probe, and pipe penetrations free from air leakage / frost buildup or damage?				
11.	Are all pipes properly insulated, i.e., covered with correct insulation and jacketing?				
12.	Are all pipes and surfaces inside the freezer free from excessive frost, ice and condensate buildup? If no, was freezer/anteroom warmed up and cleaned as necessary if product is removed? (If Freezer is unable to be shut down, schedule cleaning).				
13.	Are the pressure relief ports frost-free and functioning properly? Repair as necessary.				
14.	Are all condensate drain lines effectively removing condensation from evaporator collection pans? Check the slope and condition of the pan, and drain line.				
15.	Is the temperature monitoring device (TempGuard, Tutela, etc.) working and reading the correct temperature? Compare reading to NIST thermometer reading. Record both readings. NIST _____ Temperature Monitoring Device _____				
16.	Is the defrost condensate catch pump working correctly (if applicable)? Check level switch.				
17.	Does the freezer / anteroom door have a ramp? If yes, is the ramp level and working correctly?				
18.	Is the battery backup device located and operating correctly (if applicable), i.e., alarm lights, low battery, etc.?				
19.	Does this freezer have the PVC pipes installed around the perimeter for clearance to guarantee adequate air flow?				

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Condenser/Compressor Package							
Condenser Manufacturer		Model #		Serial #			
Compressor Manufacturer		Model #		Serial #			
					Yes	No	N/A
20.	Is the oil level in compressor correct? Maintain at ¼ to ¾ sight glass as required. Add if needed.						
21.	Is the oil level sight glass clean and clear to indicate level? Remove and clean if necessary.						
22.	Change oil in compressor every 24 months. Always use Low Temp (-50°F or lower rated) Poly-Ester oil. Always open a new can of oil. Never use oil exposed to the atmosphere. Date of last oil change:_____ Was the oil changed this service?						
23.	If system has been exposed to atmospheric conditions, replace suction and liquid line filters, and change the compressor oil. Was the oil changed, if applicable?						
24.	Check the refrigerant charge. Is it adequate to maintain head pressure, i.e., with Headmaster (no bubbles)? Add, if necessary.						
25.	Was there an acceptable amount of refrigerant? If added more than once, perform complete pressure and leak test to find and repair leak. Record amount of refrigerant used (if applicable):_____						
26.	Was the receiver (if applicable) and compressor crankcase heater amp draw checked for proper operation? Record values:_____						
27.	Inspect the sealed refrigerant systems for leaks. Look for signs of oil stains on interconnecting piping and the coil header and u bends. Look at areas of solder joints, clamps and safety relief valve on receiver. Use electronic leak detector and soap bubbles for accuracy. Was it acceptable without any leaks? Repair as needed.						
	• Check all flanged connections, flare nuts, service valves, valve packings, bolts, fittings, and line clamps for tightness and signs of leaks. Were all these items acceptable without signs of leaks? Repair as required.						
	• Check control lines (capillary tubes, braided hoses, etc.). Was it free of evidence of rubbing, chafing, and separation? Repair as needed, and note work performed in comments.						
28.	Clean condenser coil by using pressurized water and a commercial coil cleaner, if needed. Never use an acid based cleaner. Flush and rinse coil until no residue remains. At times, a good brushing will accomplish cleaning. Clean coil a minimum of twice per year or more as local conditions require. Date of last cleaning:_____ Were the condensers cleaned?						
29.	Lubricate the fan motor bearings (if applicable). Check for vibrations or unusual noises. Check the whole condenser cabinet, and replace any missing screws. Were all screws present and fan motor bearings in good condition?						
30.	Check the condition of the insulation on the refrigeration lines. Are all lines covered with the correct insulation including jacketing?						
31.	Was the freezer free of ice buildup on any lines or joints of insulation? Repair any torn or missing insulation, and note the work performed in comments.						

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Condenser/Compressor Package <i>(continued)</i>							Yes	No	N/A
32.	Is the unit free of any bent fins or hail damage on the condenser coil? If no, comb out and straighten.								
	If no, did you straighten any fins?								
33.	Does the unit have hail guards?								
34.	Check the electrical and control cabinet for cleanliness. Look for signs of moisture, dirt, debris, insects or wildlife. Blow out and clean as necessary. Is the wiring routed correctly and wire tied together in runs and not spaghetti like? Correct as necessary.								
35.	Check and tighten all electrical connections on the terminal board, fuse blocks, contactors, control devices, compressor motor, time clock, relays and any point where wiring comes together. Were all electrical connections acceptable?								
36.	Visually check all electrical devices for any overheating and signs of discoloration, contactor points for pitting and any wiring with discolored or melted insulation. Repair as necessary. Were all checks acceptable?								
37.	Check and verify the settings on the Motor Monitor Phase and Imbalance device are set correctly. Were the settings correct?								
	Voltage Range	<input type="text"/>	Imbalance %	<input type="text"/>	Trip Delay	<input type="text"/>	Reset Delay	<input type="text"/>	
38.	Check and verify the fuses in place are the correct amps required for the application. Change if necessary. Were the fuses found to be acceptable?								
	Observed	Control fuses Amp rating	<input type="text"/>	Defrost heaters fuses Amp rating	<input type="text"/>				
	Changed to	Control fuses Amp rating	<input type="text"/>	Defrost heaters fuses Amp rating	<input type="text"/>				
39.	Check all capacitors and start components for fluid leaking, swelling and discoloration. Replace as necessary. Were all checks acceptable?								
40.	Check fan blades, motors, and mounting brackets for tightness. Check for cracks, loose or missing screws, rivets or mounting bolts. Replace components, and adjust as required. Were all checks acceptable?								
41.	Verify correct fan rotation and adequate clearances from walls or other equipment for proper supply and discharge of airflow through and around the condenser. Is there adequate space?								
42.	Are condenser fan controls properly operating? Check setting on fan cycle control, if applicable, and record settings.								
	Settings	Pressure	<input type="text"/> psig	Temperature	<input type="text"/> °F				
43.	Check refrigerant moisture condition via sight glass and moisture indicator. (Green center OK – Yellow center indicates moisture and contaminates) Was it acceptable? Record which color: _____ Replace refrigerant if required, and document on this form.								
44.	Check compressor suction, and discharge pressure and temperature, and determine compressor superheat, and record all.								
	Suction Pressure	<input type="text"/> psig	Discharge Pressure	<input type="text"/> psig					
	Suction Temperature	<input type="text"/> °F	Discharge Temperature	<input type="text"/> °F					
	Actual Suction/PT chart Press _____ psig = _____ temp minus actual suction temp of _____ = Superheat at compressor of _____ °F								

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Condenser/Compressor Package <i>(continued)</i>				Yes	No	N/A
45.	Does this system have liquid refrigerant sub-cooling? If so, check and verify the liquid refrigerant temperature entering and leaving the sub-cooler heat exchanger, and record. (system has to be running)					
46.	Entry Temp. = _____°F - Exit Temp. = _____°F = Temp drop across sub-cooler = _____°F					
47.	Check and verify the operation of the safety and operating controls of the system, .i.e., T-Stat setting and differential, suction pressure cut in / cut out, discharge temp control (liquid injection or sub-cooler for 2 nd stage (if applicable), discharge pressure control (headmaster and or fan cycle device)					
	Suction pressure device cut in Setpoint <input type="text" value="psig"/> Actual <input type="text" value="psig"/> Suction pressure device cut out Setpoint <input type="text" value="psig"/> Actual <input type="text" value="psig"/> Discharge pressure/temp device cut in Setpoint <input type="text" value="psig/°"/> Actual <input type="text" value="psig/°"/>					
NOTE: This data is for Corporate Facilities Engineering Use ONLY						
48.	Check motor amp draw and voltage on compressor, control circuit and fan(s), and compare with nameplate data. Record findings. Were all checks acceptable? Compressor Amps L1 <input type="text"/> L2 <input type="text"/> L3 <input type="text"/> Fan(s) Amps L1 <input type="text"/> L2 <input type="text"/> Compressor Volts L1 <input type="text"/> L2 <input type="text"/> L3 <input type="text"/> Fan(s) Volts L1 <input type="text"/> L2 <input type="text"/> Controls Amps L1 <input type="text"/> L2 <input type="text"/> Controls Volts L1 <input type="text"/> L2 <input type="text"/>					
49.	Check and verify the amp draw and voltage on all defrost heater circuits, and compare to nameplate data. Check and verify the defrost termination and fan delay control is performing correctly, and record results. Check and verify the defrost time clock control is set to correct time for this unit and the schedule (pins if applicable) are installed in the correct times. (Also tight). Were the settings correct? Defrost Heater Amps L1 <input type="text"/> L2 <input type="text"/> Defrost Heater Volts L1 <input type="text"/> L2 <input type="text"/> Defrost termination temperature (including units °F or °C) <input type="text"/> Defrost timer maximum time setting <input type="text"/> Is defrost terminating on temperature <input type="checkbox"/> or time <input type="checkbox"/>? Defrost fan delay temperature (including units °F or °C) <input type="text"/> Are the fans delaying at the completion of defrost? <input type="text"/> Are all functions performing correctly and settings are correct and as validated?					

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Evaporator(s)									
Evaporator Manufacturer		Model #			Serial #				
							Yes	No	N/A
50.	Record defrost cycles below:								
	Defrost Cycle Times						Approximate Duration		
	1 st	2 nd	3 rd	4 th	5 th	6 th			
51.	Are defrost cycles functioning as intended and effective in removing all frost and ice from coil?								
52.	Is the defrost operating without overheating and which may cause steaming that condenses on the fans, evaporator and ceiling?								
52.	Is the defrost termination and fan delay adjustable?								
53.	Record thermostat settings below (include units, °F or °C):								
		Setpoint	<input style="width: 100px;" type="text"/>			Differential	<input style="width: 100px;" type="text"/>		
*Recommended setting must match validated installation set point									
54.	Verify correct fan rotation and adequate clearances are provided for proper return and discharge of airflow. Are product cases located in a manner that would allow for supply and return of air flow (i.e. not in front, under or behind the evaporator)? If not, inform the center management to rearrange.								
55.	Is the evaporator drain pan heater functioning properly?								
Check for any ice buildup in pan or hanging over the edges. Was the check acceptable?									
56.	Manually clean and remove all ice accumulation from the back and front (fan side) of the evaporator coil(s), fan assemblies, fan guards, drain pans, fan housings and straighten fins as required. Wash coil and pan if brushing will not remove buildup. Freezer should be emptied and warmed up above freezing to thoroughly remove all ice and frost from walls, floors and ceilings. Was this freezer shutdown and warmed up and cleaned?								
57.	Thermostatic expansion valves are set to the proper superheat settings (see below)								
		Suction Line Pressure @ evaporator	Suction Line Temperature @ evaporator °F			PT Chart Pressure/ Temperature	Calculated Super Heat Temperature °F		
Ensure superheat setting is appropriate (3 to 9°F). Get the results when freezer equipment is cycling at the required normal temperature.									

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Evaporators <i>(continued)</i>				
		Yes	No	N/A
58.	Check fan blades, motors and mounting brackets for tightness. Check for cracks, loose or missing setscrews, rivets or mounting bolts. Check wiring harness for fans behind motors for sagging or loose wires. Clean off the back or the fan motors to clean the winding vents. Replace components, and adjust as required. Were all checks acceptable?			
59.	Check for excessive vibration or unusual noises on sheet metal panels on fans while unit is operating. Replace components, and adjust, as required. Was check acceptable?			
60.	Check all wiring terminal connections on evaporator. Tighten all screw and stab connections. Tie any loose wiring together to prevent touching the defrost heaters. Check for good ground connection. Were all checks acceptable?			
61.	Visually check the defrost heaters on the back of the coil for any bowing out. Put unit into defrost. When rods are hot, push any that are bowed out back into the slot of the fins, and add extra clips to keep in place. Were rods acceptable without bowing?			
62.	If this system has a central electronic controller and remote monitoring system such as MasterBilt Master controller or Carel controller, verify the communication is working, check all terminal wiring connections for tightness, check fuses, power supplies, batteries (if applicable) relays and contacts for correct operation. Verify all programmed parameters are correct as when validated. Does this system have a MasterBilt controller? Does this system have a Carel controller? Does this system have another type controller? Record here, if necessary _____			
63.	Inspect for any signs of oil stains on u bends, piping header, coil fins and tubes. Check complete coil with electronic leak detector. Were all checks acceptable?			
64.	With the liquid line pumped down and all liquid refrigerant removed (only gas left), remove the TXV / EEV inlet strainer (if applicable), and clean off any debris. Was it free of debris?			
65.	Verify that all fans are rotating at the same speed and that the air velocity is approximately the same from each fan. Are they all the same?			

Review				
66.	Review general equipment condition with Center Manager.			

NOTE: Each freezer and anteroom requires its own Form EQP-019B to be completed, i.e., a center with two freezers and one anteroom would complete three forms. If a freezer has two refrigeration systems (i.e., evaporator coils and condensing units), a separate EQP-019B form must be completed for each refrigeration system.

Overall Comments & Repair Notes			
Signature		Date	

Service Technician / Provider Information			
Technician Name			
Provider Name		Phone	
Street		City	
State		Zip	

Management Review			
Center Management		Date	
Quality Unit		Date	

PM documents are to be uploaded to the Maximo service request.