

CASE STUDY

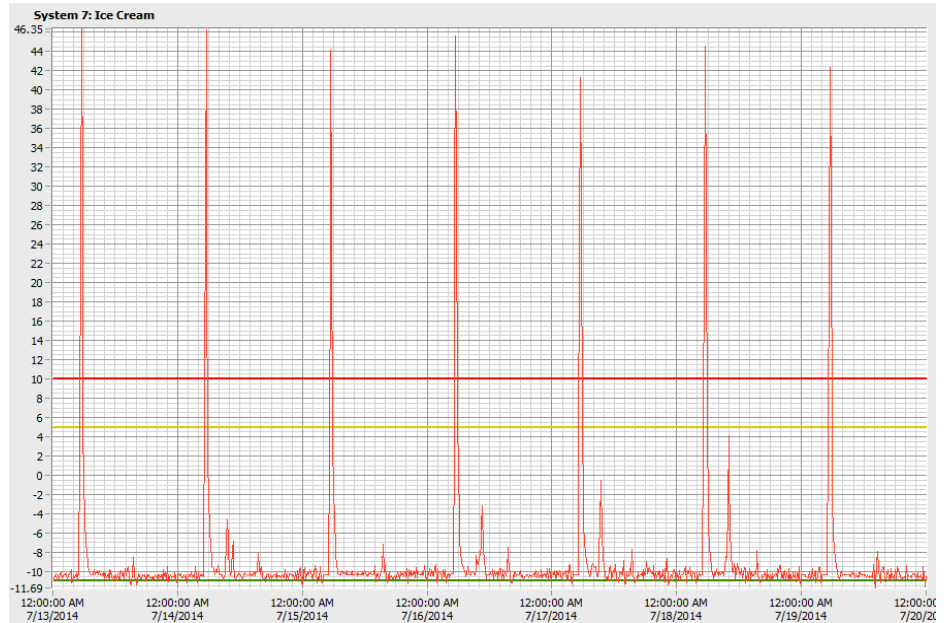
Normal Operation of a Refrigeration System



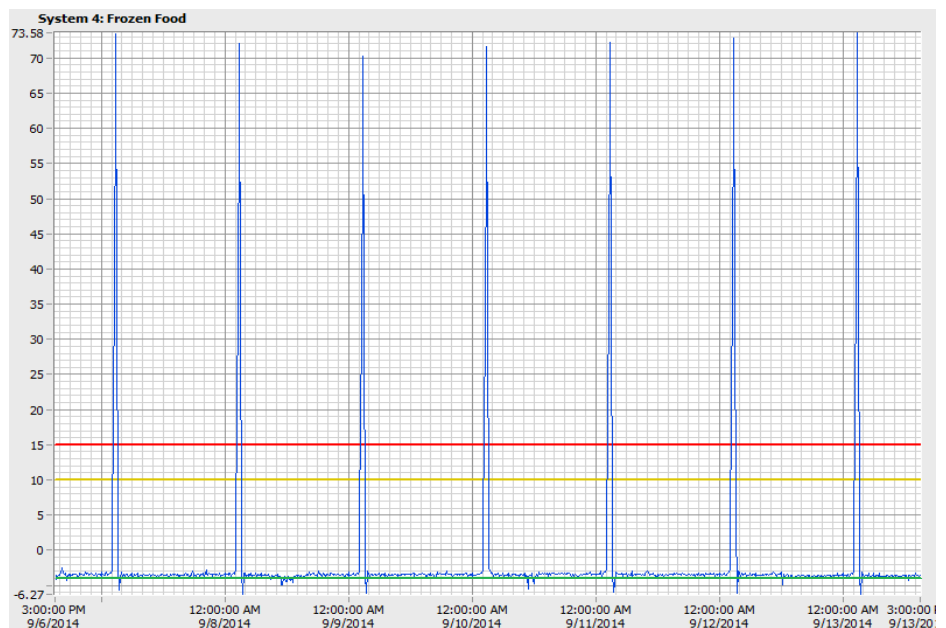
When studying the behavior of refrigeration systems it is useful to know that such systems may work very well indeed and as designed. There may be days, weeks and months of perfect operation. While in real life all kind of incidents disturb the perfect operation, it is good to know that perfect operation is possible, which will be demonstrated by the following real world examples.

Setpoint -11°F: This trend graph on picture 4 is showing 7 days of temperature measurements in an Ice Cream case, the temperature trend line is in Red color. The temperature setpoint of the freezer is set to -11°F. There are 3 horizontal lines: **Red:** HH alarm limit, **Yellow:** H alarm limit, **Green:** Set point. The defrost is every 24 hours with temperature rise higher than 10°F. No alarms are issued.

Setpoint -4°F: This trend graph on picture 3 is showing 7 days of temperature measurements in a Frozen Food case, the temperature trend line is in Blue color. The temperature setpoint of the freezer is set to -4°F. There are 3 horizontal lines: **Red:** HH alarm limit, **Yellow:** H alarm limit, **Green:** Set point. The defrost is every 24 hours with temperature rise higher than 15°F. No alarms are issued.



Picture 4: Ice Cream case; Setpoint is -11°F.



Picture 3: Frozen Food; Setpoint is -4°F.

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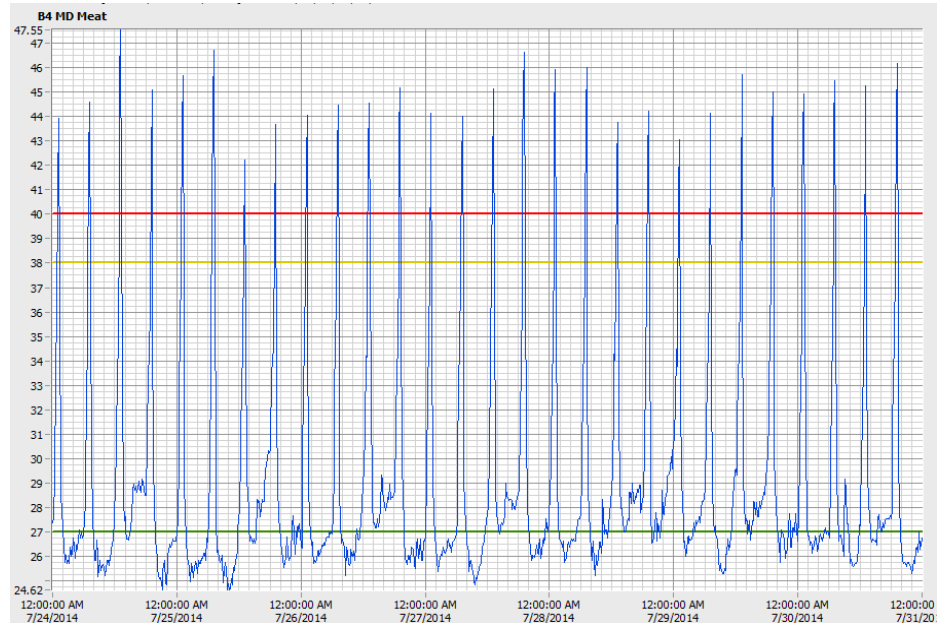
Normal Operation of a Refrigeration System



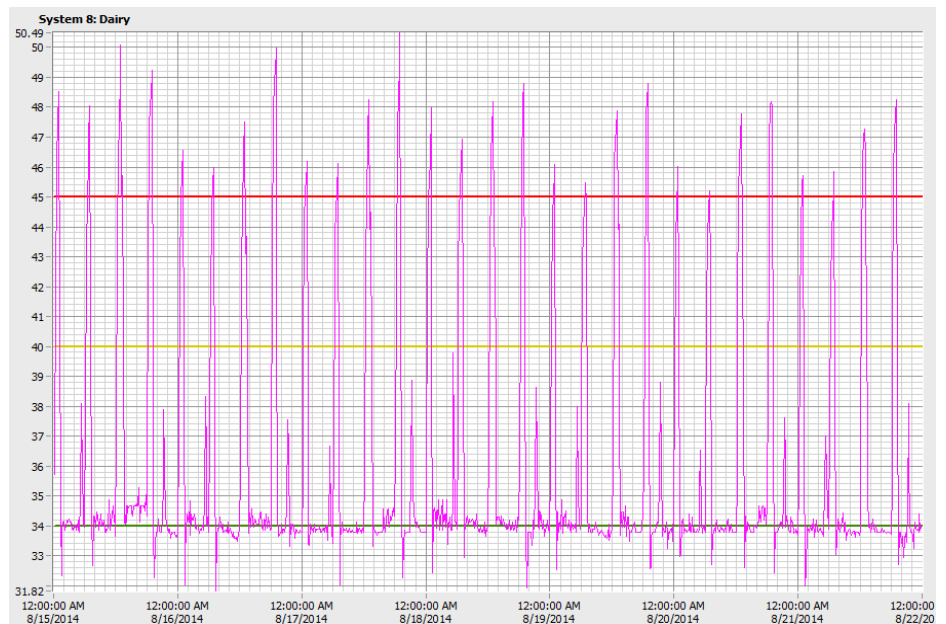
Setpoint 27°F: This trend graph on picture 2 is showing 7 days of temperature measurements in a Multi Deck Meat case, the temperature trend line is in Blue color. The temperature setpoint of the freezer is set to 27°F. There are 3 horizontal lines: **Red:** HH alarm limit, **Yellow:** H alarm limit, **Green:** Set point. The defrost is every 6 hours with temperature rise higher than 40°F. No alarms are issued.

Setpoint 34°F: This trend graph on picture 1 is showing 7 days of temperature measurements in a Dairy cooler, the temperature trend line is in Pink color. The temperature setpoint of the Dairy cooler is set to 34°F. There are 3 horizontal lines: **Red:** HighHigh (HH) alarm limit, **Yellow:** High (H) alarm limit, **Green:** Set point. The defrost is every 6 hours with temperature rise higher than 45°F. No alarms are issued.

This VDVRM case study is from a serie of real-world examples from refrigeration systems monitored by VDV Refrigeration Monitoring system. The purpose of this serie is to bring forward actual problems, its effect on refrigeration temperatures, how the problem was detected and how the refrigeration system recovered.



Picture 2: Meat Case; Setpoint is 27°F.



Picture 1: Dairy Cooler; Setpoint is 34°F.