# APPENDIX G

## Flow Meters Details

Last Updated 10/12/2018

# Oklahoma State University Utility Meter Part Number List

OSU has a sole product agreement with Endress Hauser for all utilities flowmeters on the OSU-Stillwater Campus.

## Promag P100 magnetic flowmeters (for domestic water, chilled water, heating hot water, and condensate applications):

Standard Options:

- Liner : PTFE, PFA
- Non-hazardous area approval
- 24 Vdc power supply
- 4-20 mA HART, pulse/frequency/switch output
- No display
- Compact, aluminum coated housing
- Threaded ½" NPT electrical connection
- Class 150, carbon steel, ASME B16.5 flanges
- 316L electrodes
- NSF 61 drinking and warm water approval

| Meter connection size (inch) | Meter Part Number |
|---|---|
| **½"** | 5P1B15-AADBAADEA1KGA+AAL5 |
| **1"** | 5P1B25-AADBAADEA1K0A+AAL5 |
| **1-1/2"** | 5P1B40-AADBAADEA1K0A+AAL5 |
| **2"** | 5P1B50-AADBAADEA1K0A+AAL5 |
| **3"** | 5P1B80-AADBAADEA1K0A+AAL5 |
| **4"** | 5P1B1H-AADBAADEA1K0A+AAL5 |
| **6"** | 5P1B1F-AADBAADEA1K0A+AAL5 |
| **8"** | 5P1B2H-AADBAADEA1K0A+AAL5 |
| **10"** | 5P1B2F-AADBAADEA1K0+AAL5 |
| **12"** | 5P1B3H-AADBAADEA1K0A+AAL5 |

## *Standard* line size Prowirl F200 vortex flowmeters (for steam applications where meter size is the same as line size):

Standard Options:

- Non-hazardous area approval
- 4-20 mA HART, pulse/frequency/switch output
- Display :SD02 with 4-line, push buttons and data backup function
- GT20 dual compartment, aluminum coated housing
- Threaded ½" NPT electrical connection
- Class 150, carbon steel, ASME B16.5 flanges
- 316L electrodes with integral temperature measurement and graphite sensor seal
- 0.75%, 3-point calibration flow

| Meter connection size (inch) | Meter Part Number |
|---|---|
| **½"** | 7F2C15-AADCCADCAAAAASKA1+AADJ |
| **1"** | 7F2C25-AADCCADCAAAAASKA1+AADJ |
| **1-1/2"** | 7F2C40-AADCCADCAAAAASKA1+AADJ |
| **2"** | 7F2C50-AADCCADCAAAAASKA1+AADJ |
| **3"** | 7F2C80-AADCCADCAAAAASKA1+AADJ |
| **4"** | 7F2C1H-AADCCADCAAAAASKA1+AADJ |
| **6"** | 7F2C1F-AADCCADCAAAAASKA1+AADJ |
| **8"** | 7F2C2H-AADCCADCAAAAASKA1+AADJ |

## *Reduced* meter size Prowirl F200 vortex flowmeters (for steam applications where meter size is *smaller* than line size):

| Standard Options: | |
|---|---|
| - Non-hazardous area approval<br>- 4-20 mA HART, pulse/frequency/switch output<br>- Display :SD02 with 4-line, push buttons and data backup function<br>- GT20 dual compartment, aluminum coated housing | - Threaded ½" NPT electrical connection<br>- Class 150, carbon steel, ASME B16.5 flanges<br>- 316L electrodes with integral temperature measurement and graphite sensor seal<br>- 0.75%, 3-point calibration flow |

| Line Size > Meter Size (inch) | Meter Part Number |
|---|---|
| **1-1/2" > 1"** | 7R2CRG-AADCCADCAAAAASKA1+AADJ |
| **2" > 1-1/2"** | 7R2CRJ-AADCCADCAAAAASKA1+AADJ |
| **3" > 2"** | 7R2CRK-AADCCADCAAAAASKA1+AADJ |
| **4" > 3"** | 7R2CRM-AADCCADCAAAAASKA1+AADJ |
| **6" > 4"** | 7R2BRN-AADCCD3AASK+AADJ |
| **8" > 6"** | 7R2CRR-AADCCADCAAAAASKA1+DJ |

## CERABAR pressure transmitter (for all applications):

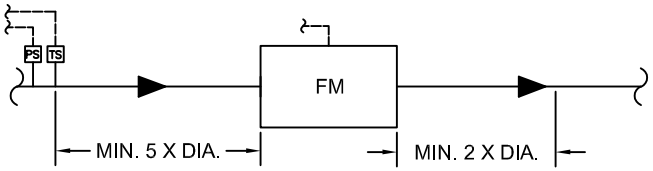
| Standard Options: | |
|---|---|
| - Non-hazardous area approval<br>- 4-20 mA output<br>- IP 65 NEMA 4x enclosure<br>- Threaded ½" NPT electrical connection<br>- EPDM seal | - 0-150 PSIG sensor range, 600 PSI overload<br>- Threaded ½" MNPT / ¼" FNPT process connection<br>- 316L housing and process connection |
| All applications | PMC11-AA1V1PFVXJJ |

## RSG45 data monitors (for all applications):

| Standard Options: | |
|---|---|
| - Non-hazardous area approval<br>- 100-230 Vac power supply<br>- **16 Inputs**<br>- Threaded ½" NPT electrical connection<br>- Zink diecast, powder-coated IP65 NEMA 4 enclosure | - MODBUS RTU/TCP communication<br>- Energy Software + mathematic<br>- Integrated Web server<br>- 7" multicolor TFT display (English) |
| All applications | RSG45-AA1BBBBAA1B6+AA |

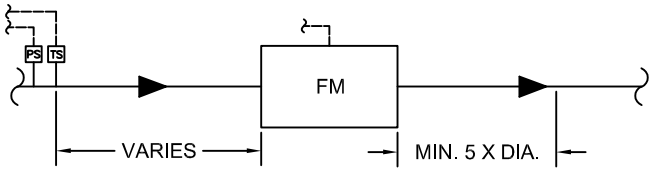
*All RSG45 data monitors must be installed in a Hoffman Pentair model A14128PHC enclosure.

MAGNETIC FLOW METER (CW, DW, HW):




- MINIMUM STRAIGHT RUNS SHOWN INCLUDE FITTINGS, VALVES, TEES, ELBOWS, AND REDUCERS.
- CONSULT THE LATEST EDITION OF THE ENDRESS HAUSER PROMAG P100 TECHNICAL INFORMATION MANUAL TO CONFIRM DIMENSIONS.

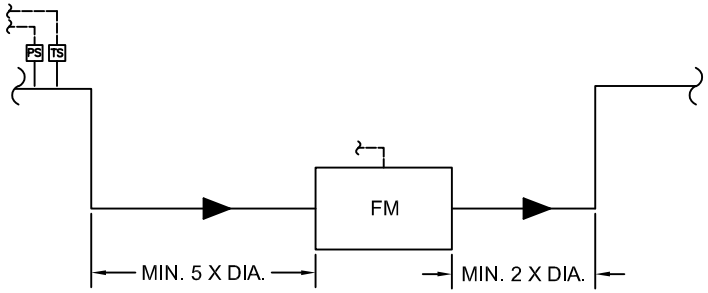
VORTEX FLOW METER (STEAM):




| MINIMUM INLET RUNS | |
|---|---|
| OBSTRUCTION | MIN. PIPE DIA. |
| PIPE REDUCER | 15 |
| SINGLE 90 ELBOW | 20 |
| DOUBLE 90 ELBOW | 40 |
| TEE | 20 |
| VALVE | 50 |

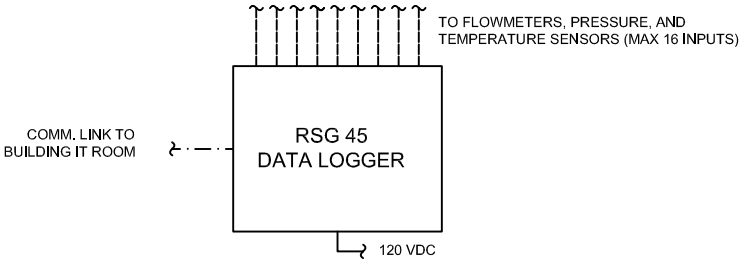
- CONSULT THE LATEST EDITION OF THE ENDRESS HAUSER PROWIRL F200 TECHNICAL INFORMATION MANUAL TO CONFIRM DIMENSIONS

MAGNETIC FLOW METER (COND):




- MINIMUM STRAIGHT RUNS SHOWN INCLUDE FITTINGS, VALVES, TEES, ELBOWS, AND REDUCERS.
- CONSULT THE LATEST EDITION OF THE ENDRESS HAUSER PROMAG P100 TECHNICAL INFORMATION MANUAL TO CONFIRM DIMENSIONS.

RSG 45 DATA LOGGER:



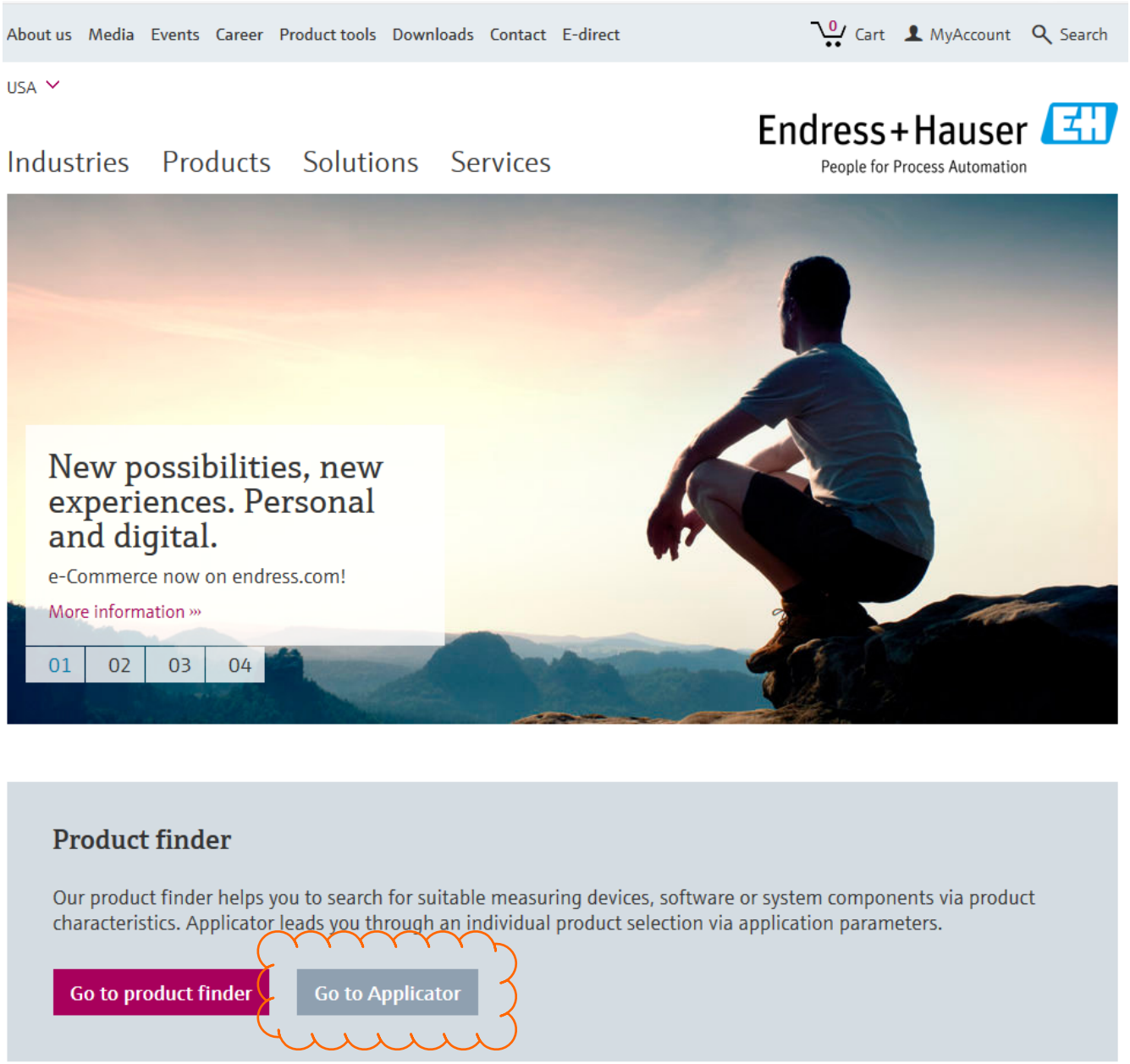

- RSG 45 MUST BE INSTALLED IN AN ACCESSIBLE PART OF THE BUILDING MECHANICAL ROOM.
- POWER REQUIREMENT FOR RSG 45 IS 120V/1/60 WITH AN MOP OF 15A. A LOCAL DISCONNECT IS REQUIRED.
- DATA LOGGER MUST BE INSTALLED IN A HOFFMAN PENTAIR MODEL A14128PHC LOCK BOX. DIMENSIONS ARE : 12' WIDE X 16.5" HIGH X 9.5" DEEP.
- 1" CONDUIT WITH PULLSTRING MUST BE INSTALLED FROM THE DATA LOGGER TO EACH METER AND SENSOR.
- A CAT6 CABLE MUST BE RUN FROM THE DATA LOGGER TO THE BUILDING IT ROOM.
- ALL WIRING MUST BE INSTALLED AND TERMINATED BY CONTRACTOR.

# STANDARD FLOW METER INSTALLATION DETAILS

# Sizing of Domestic Water Meters

1. Go to the Endress Hauser web page: https://www.us.endress.com/en

2. Click on "Go to Applicator"

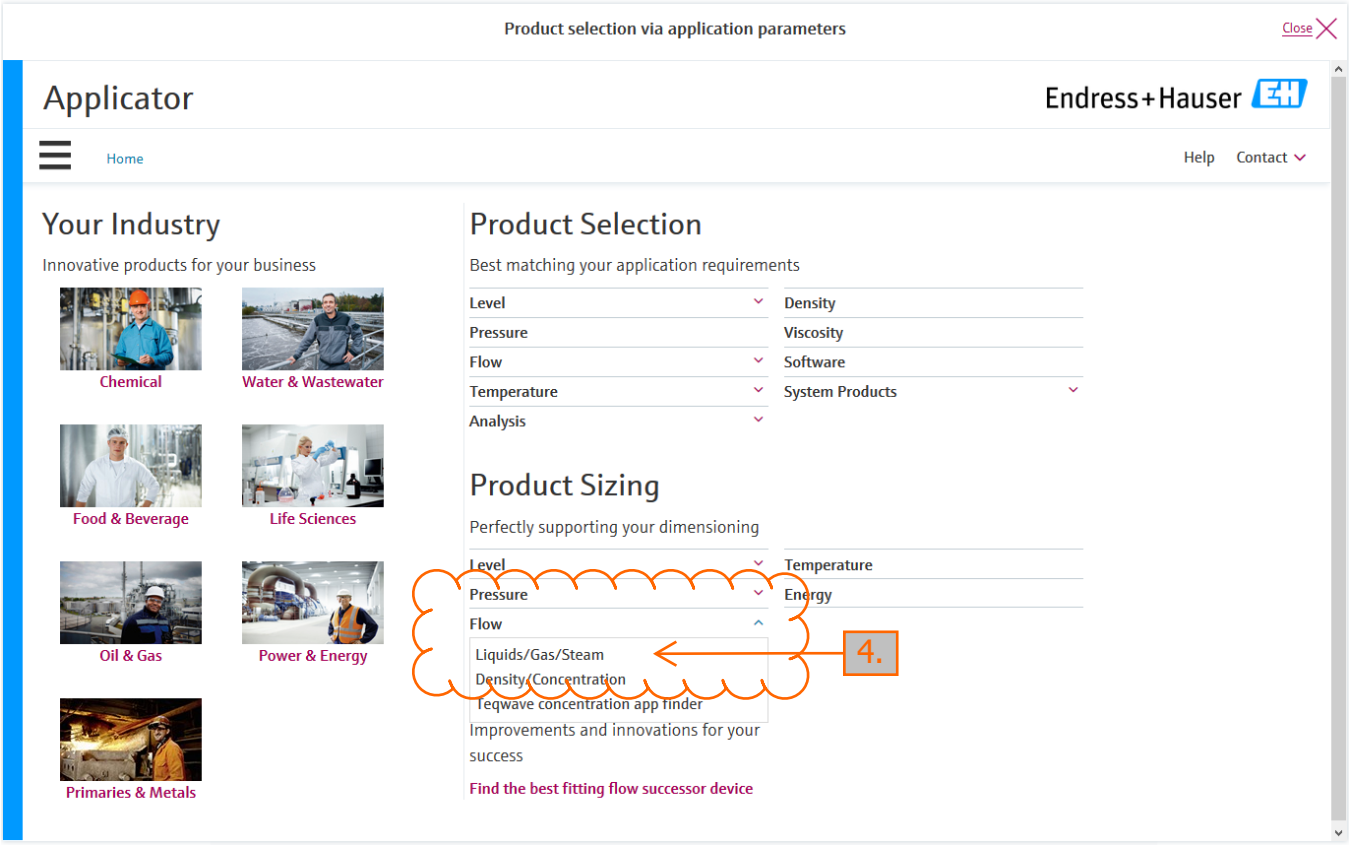


# Sizing of Domestic Water Meters

While in the 'Applicator' page

3. Select 'Flow' under the 'Product Sizing'

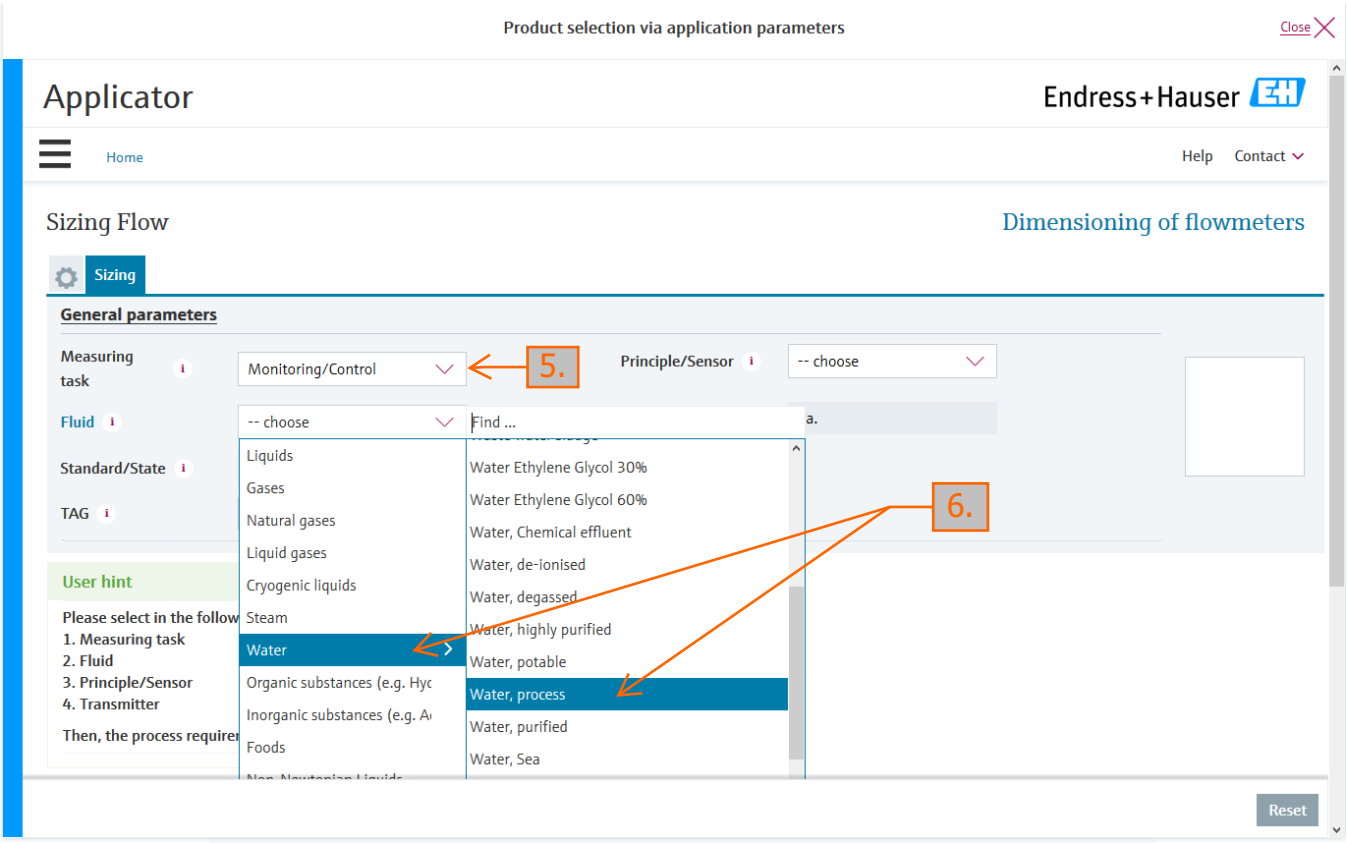
4. Select 'Liquids/Gas/Steam'



# Sizing of Domestic Water Meters

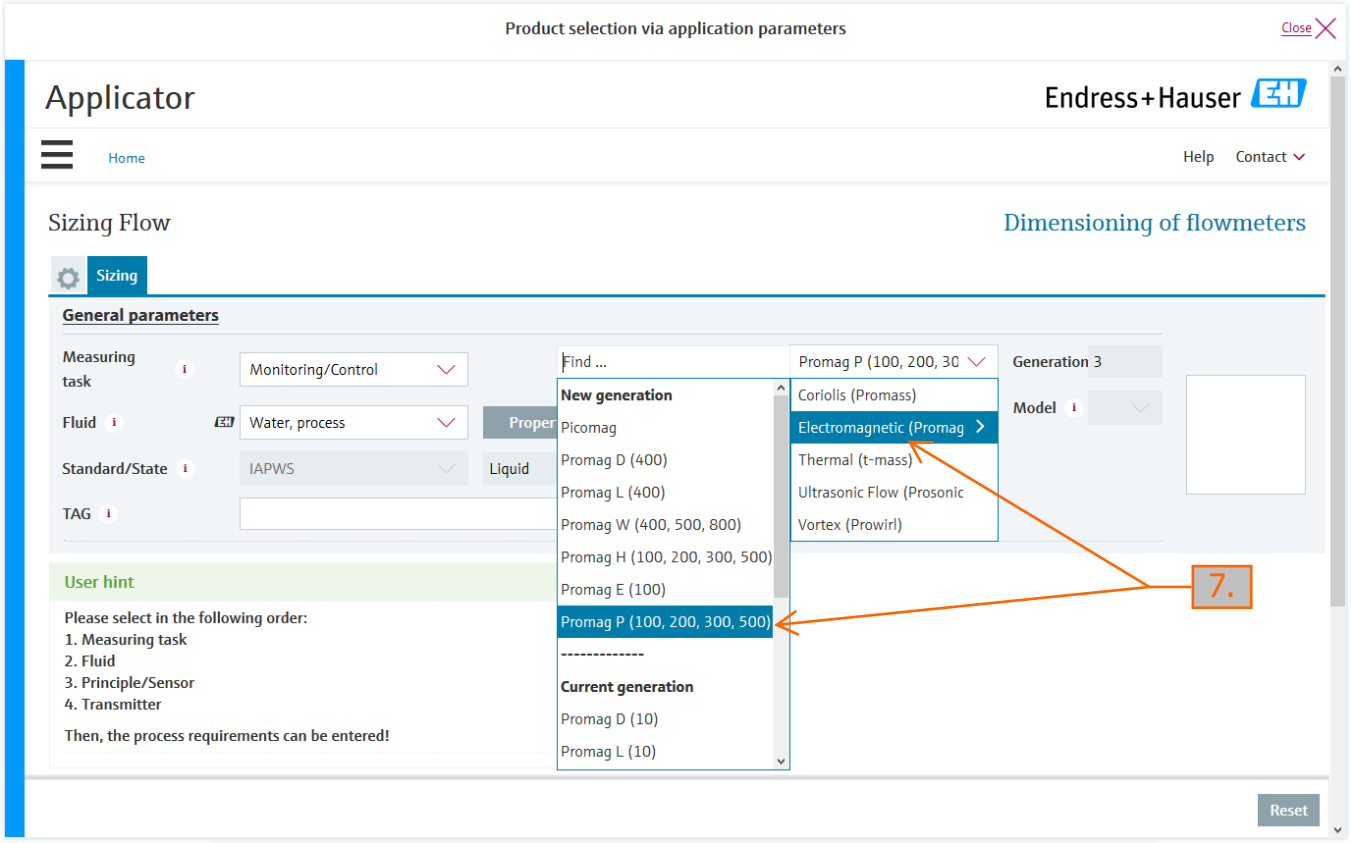
5. Select 'Monitoring/Control' under 'Measuring task'

6. Select 'Water' and then 'Water, process' under 'Fluid'



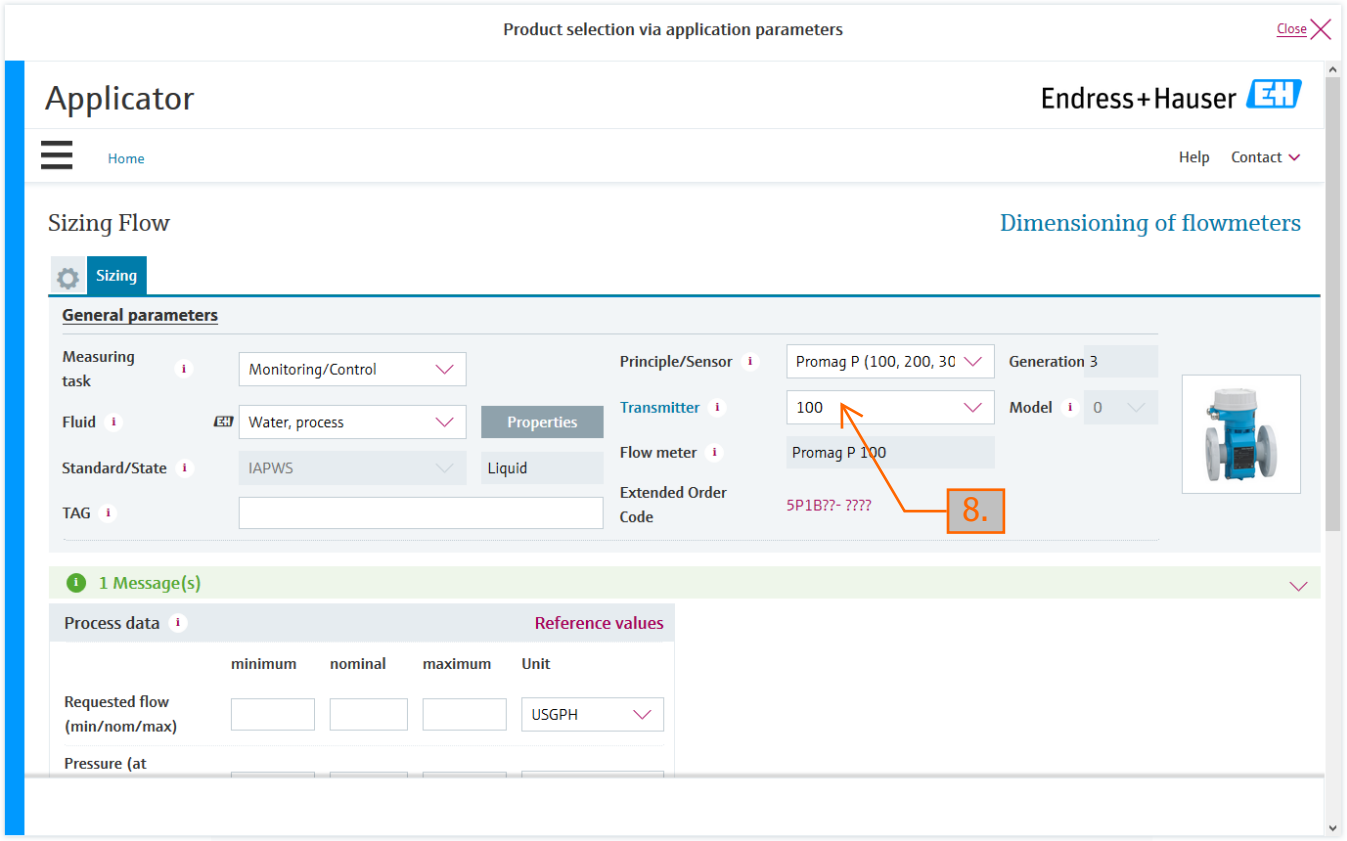
# Sizing of Domestic Water Meters

7. Select 'Electromagnetic (Promag' and then 'Promag P (100, 200, 300, 500)' under 'Principle/Sensor'



# Sizing of Domestic Water Meters

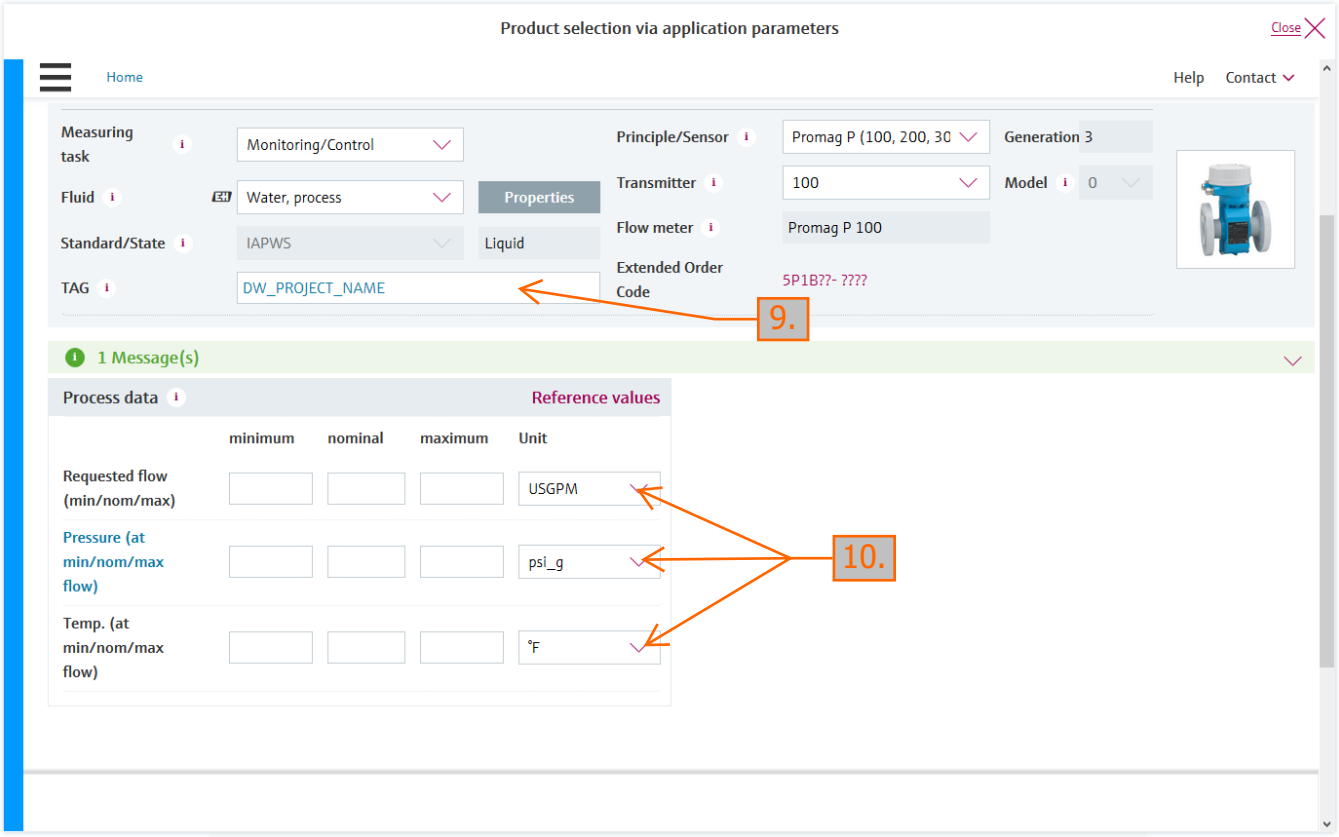
8. Select '100' under 'Transmitter'



## Sizing of Domestic Water Meters

9. In the 'TAG', write the name of the project preceded by DW that stands for Domestic Water.

10. Selection of units: USGPM for flow, 'psi_g' for pressure, and '°F' for temperature.

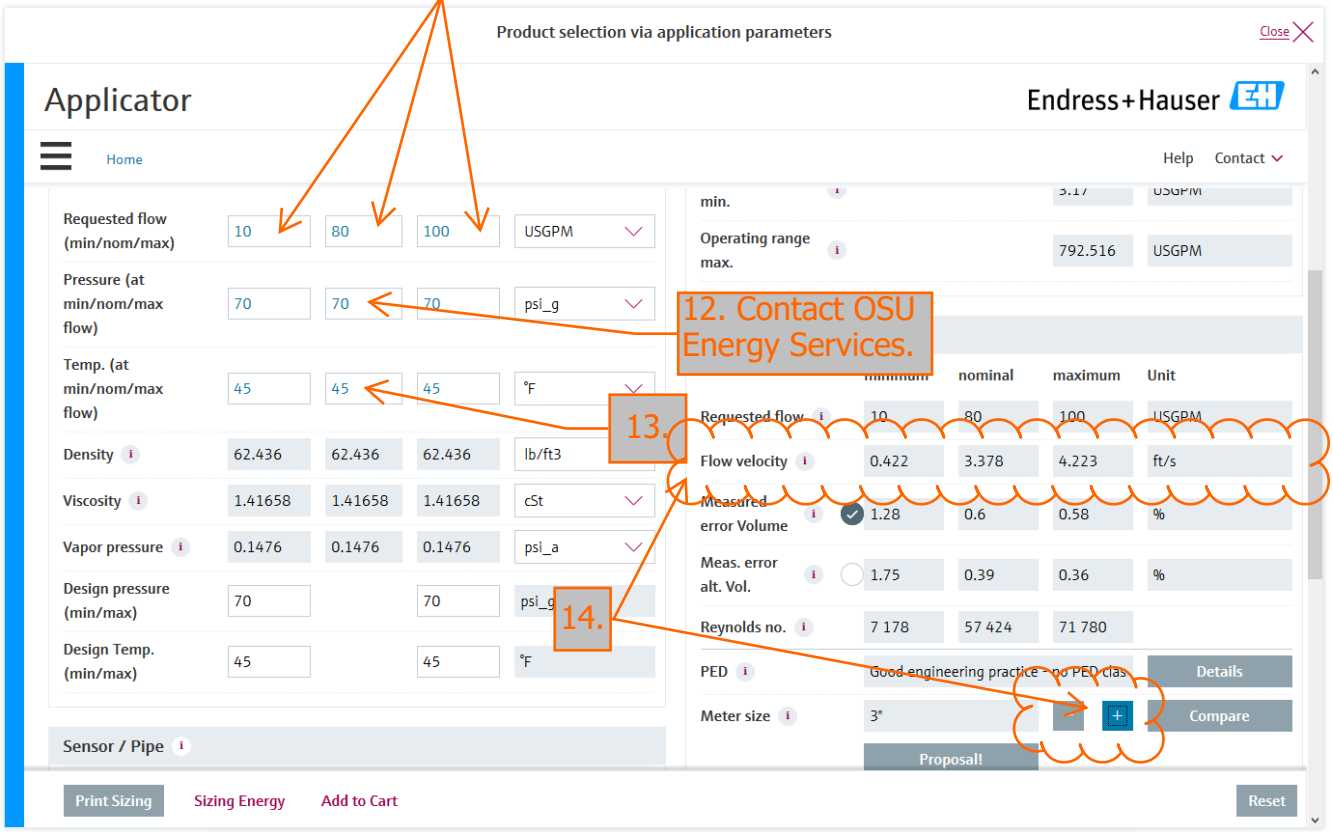


## Sizing of Domestic Water Meters

11. Using the peak flow, fill the 'Requested flow' cells: minimum, nominal, and maximum.

Maximum = Peak Flow
Minimum = 10% of peak flow
Nominal = 80% of peak flow

Example: domestic water peak flow = 100 gpm (designer)
Minimum = 10 gpm
Nominal = 80 gpm
Maximum = 100 gpm




12. Contact OSU Utilities Engineering in order to obtain the nominal pressure. It depends on the location of the project.

13. The nominal temperature used for sizing domestic water (DW) meters is 45 °F.

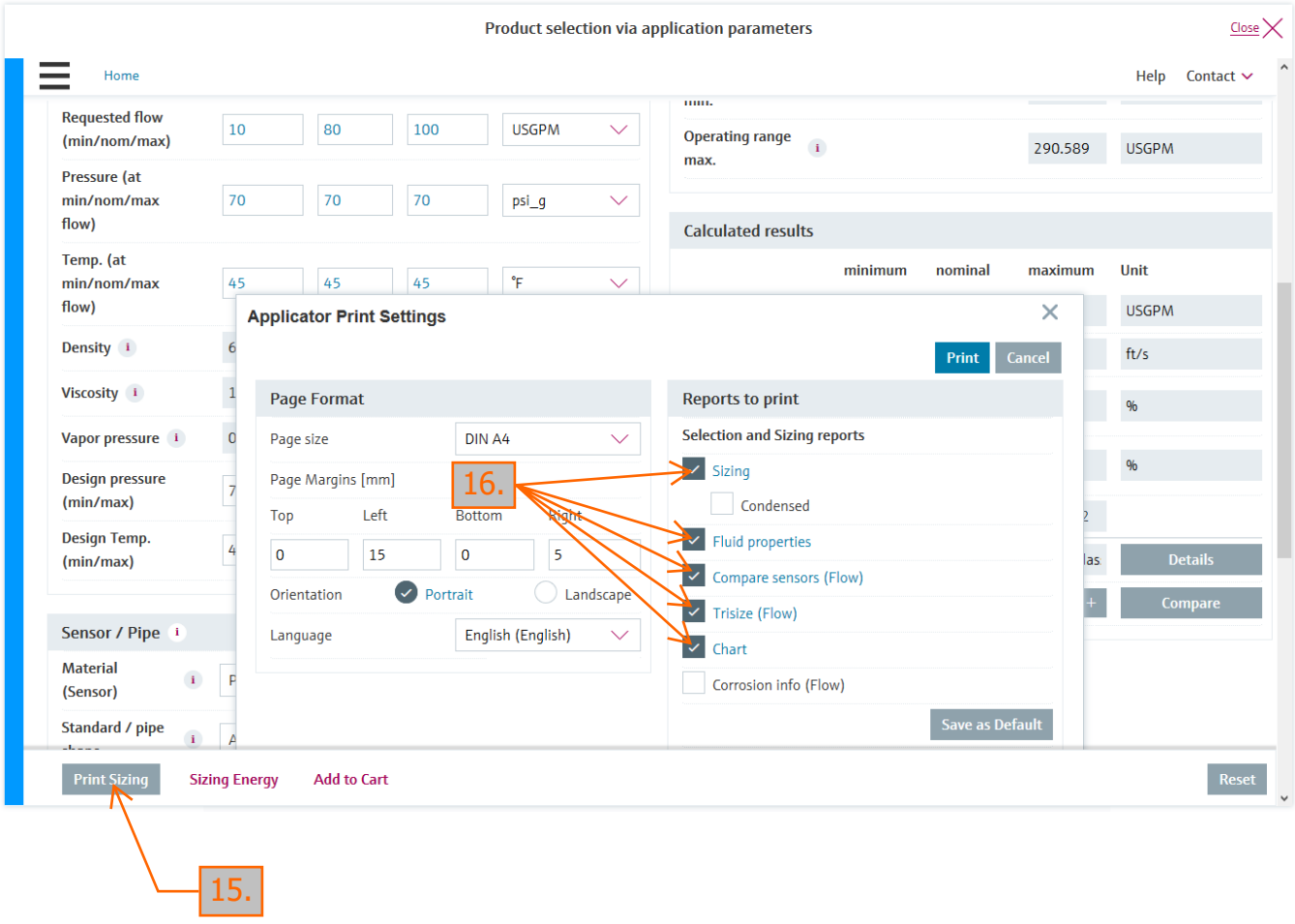
14. Verify 'Flow velocity' stays into the range between 3.3 and 8.2 ft/s. Change the 'Meter size' if it is necessary to keep the 'Flow velocity' in this range.

# Sizing of Domestic Water Meters

At this point the sizing of domestic water (DW) meter is complete. The next step is to print the results that shall be email to OSU Energy services for approval.

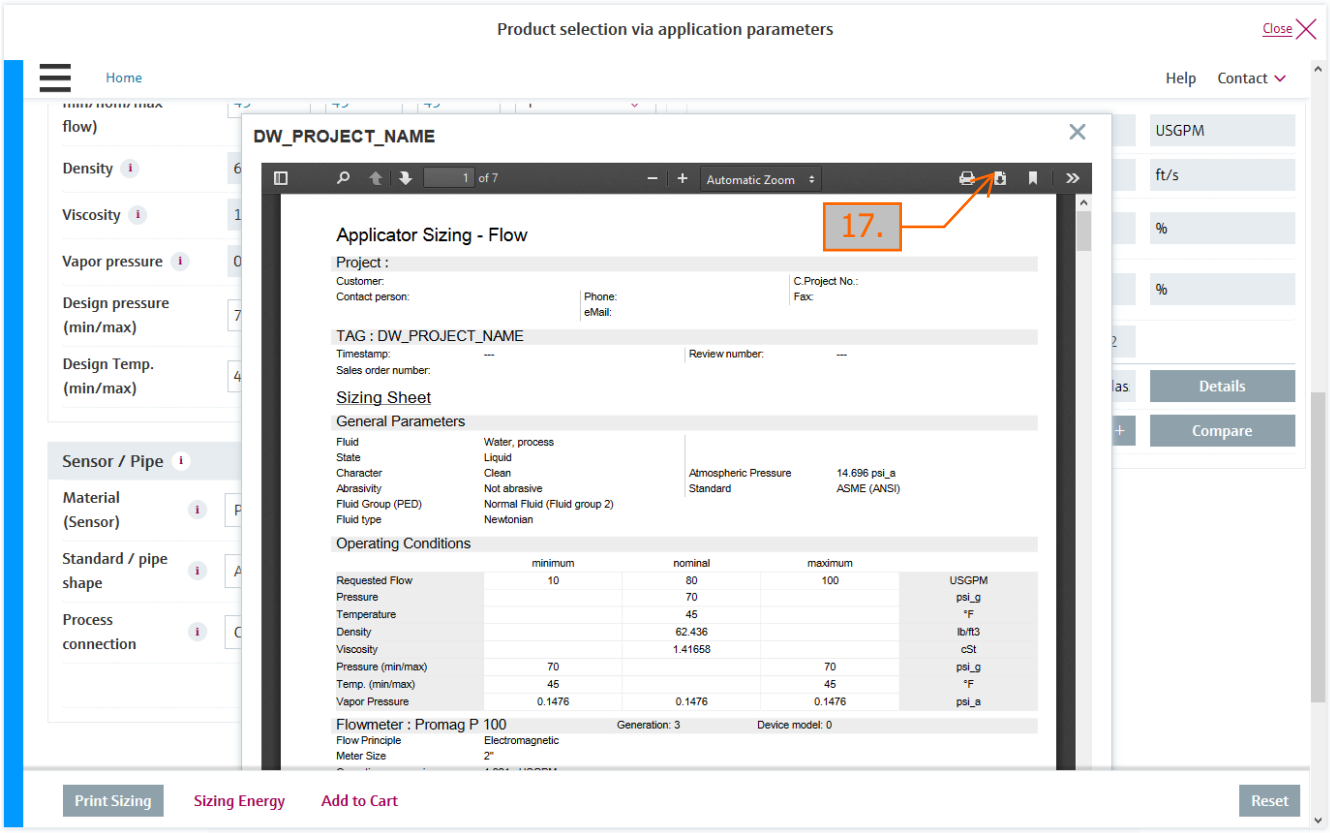
15. Select 'Print Sizing'

16. On the 'Applicator Print Settings' / 'Reports to print', select: 'Sizing', ' Fluid properties', 'Compare sensors (Flow)' 'Trisize (Flow)', and 'Chart'

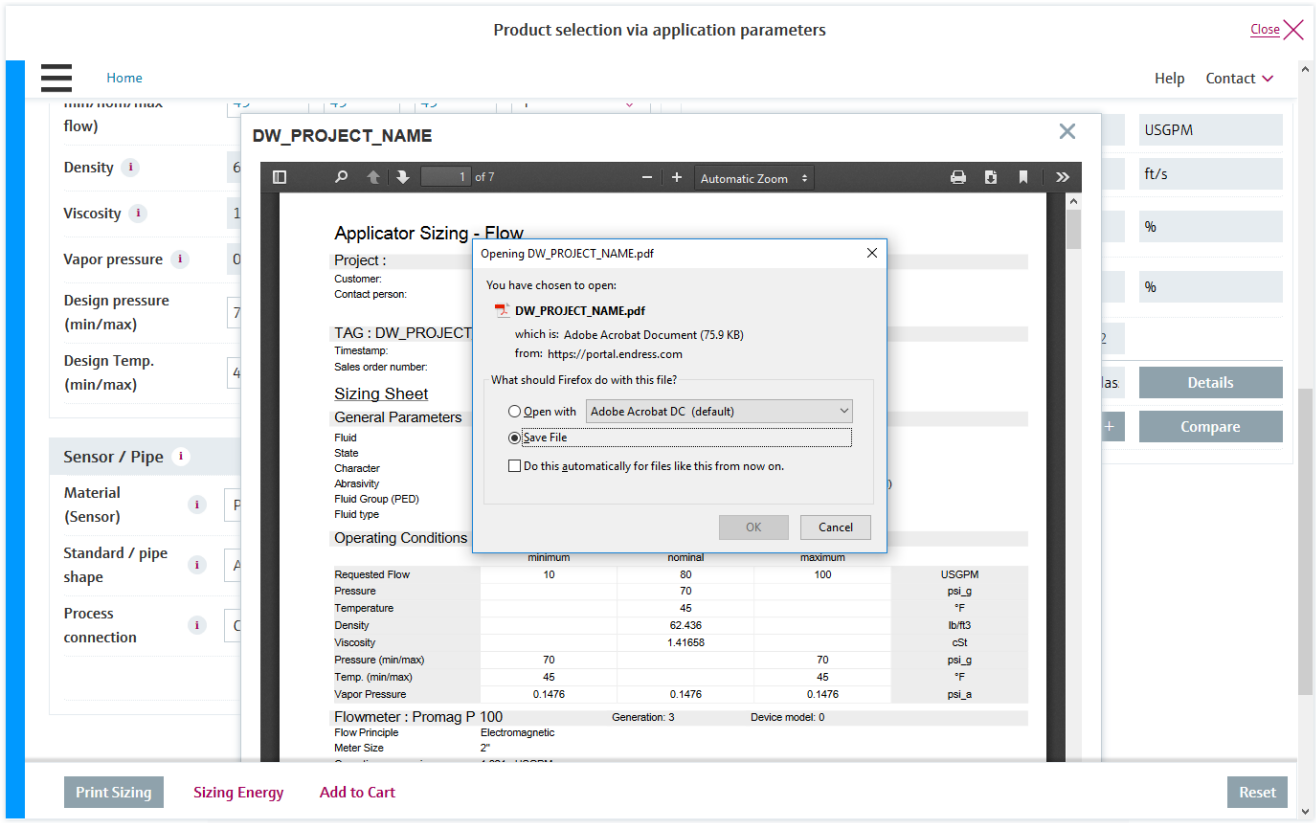


# Sizing of Domestic Water Meters

## 17. Download the pdf file



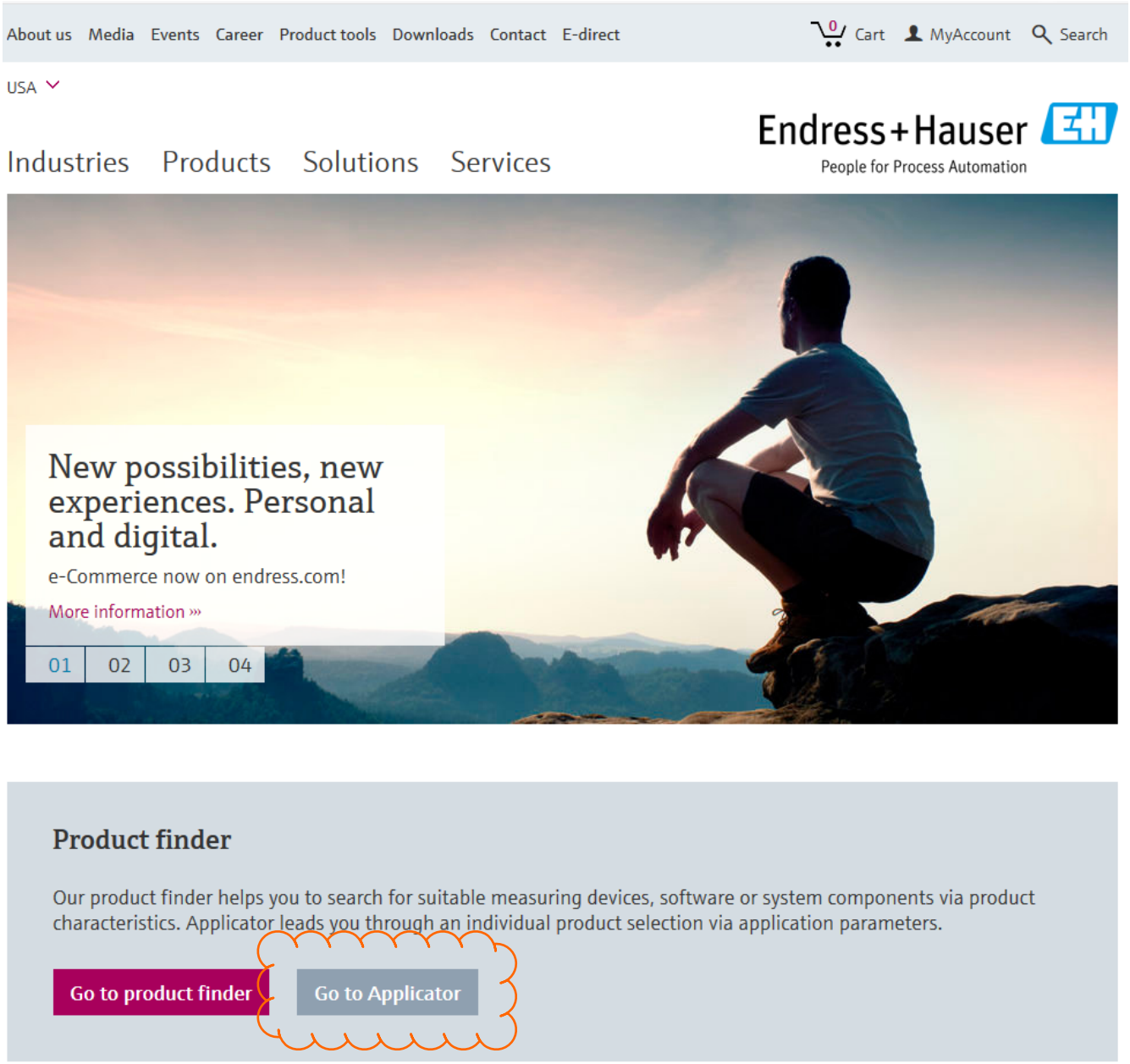

## 18. Save the pdf file



# Sizing of Hot Water Meters

1. Go to the Endress Hauser web page: https://www.us.endress.com/en

2. Click on "Go to Applicator"

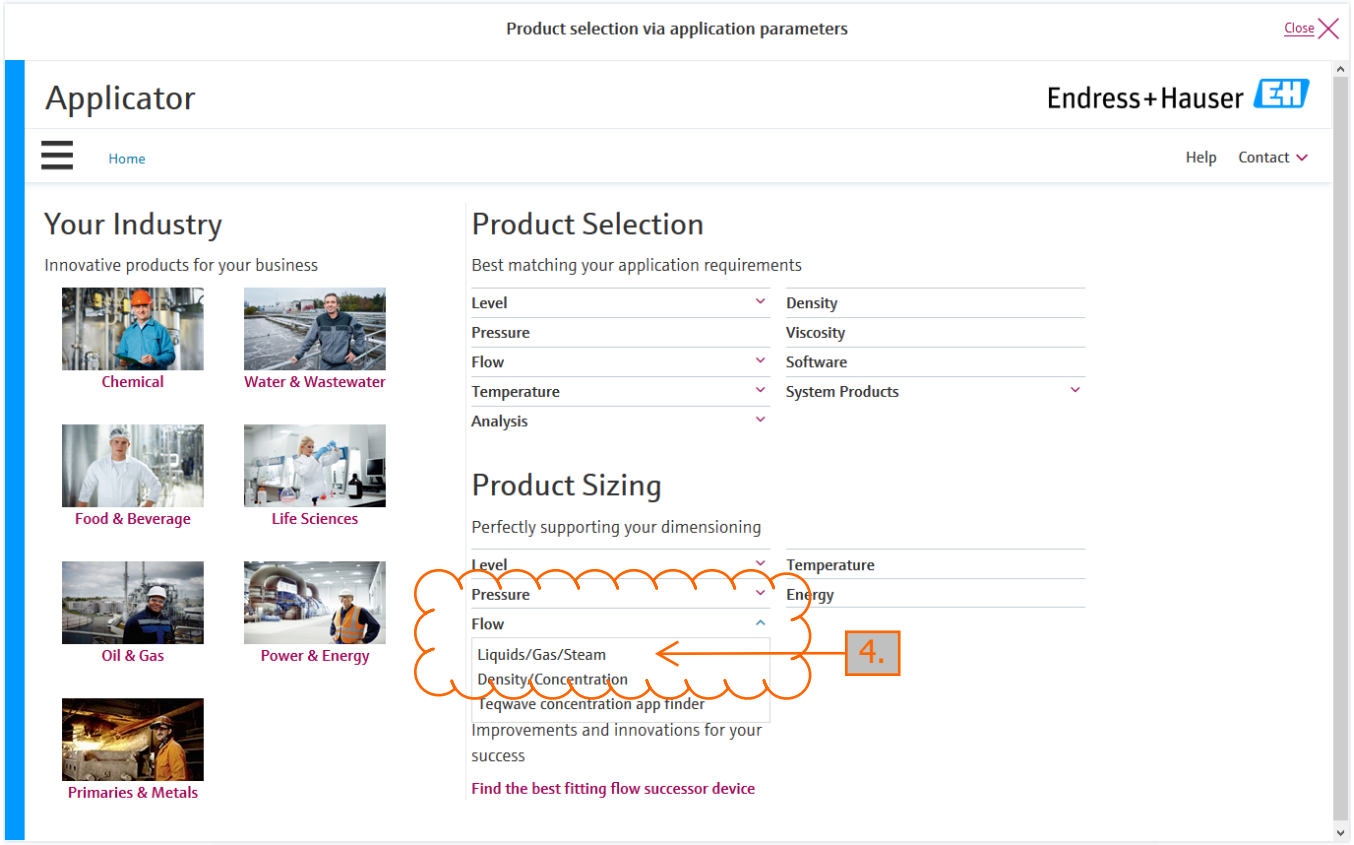


# Sizing of Hot Water Meters

While in the 'Applicator' page

3. Select 'Flow' under the 'Product Sizing'

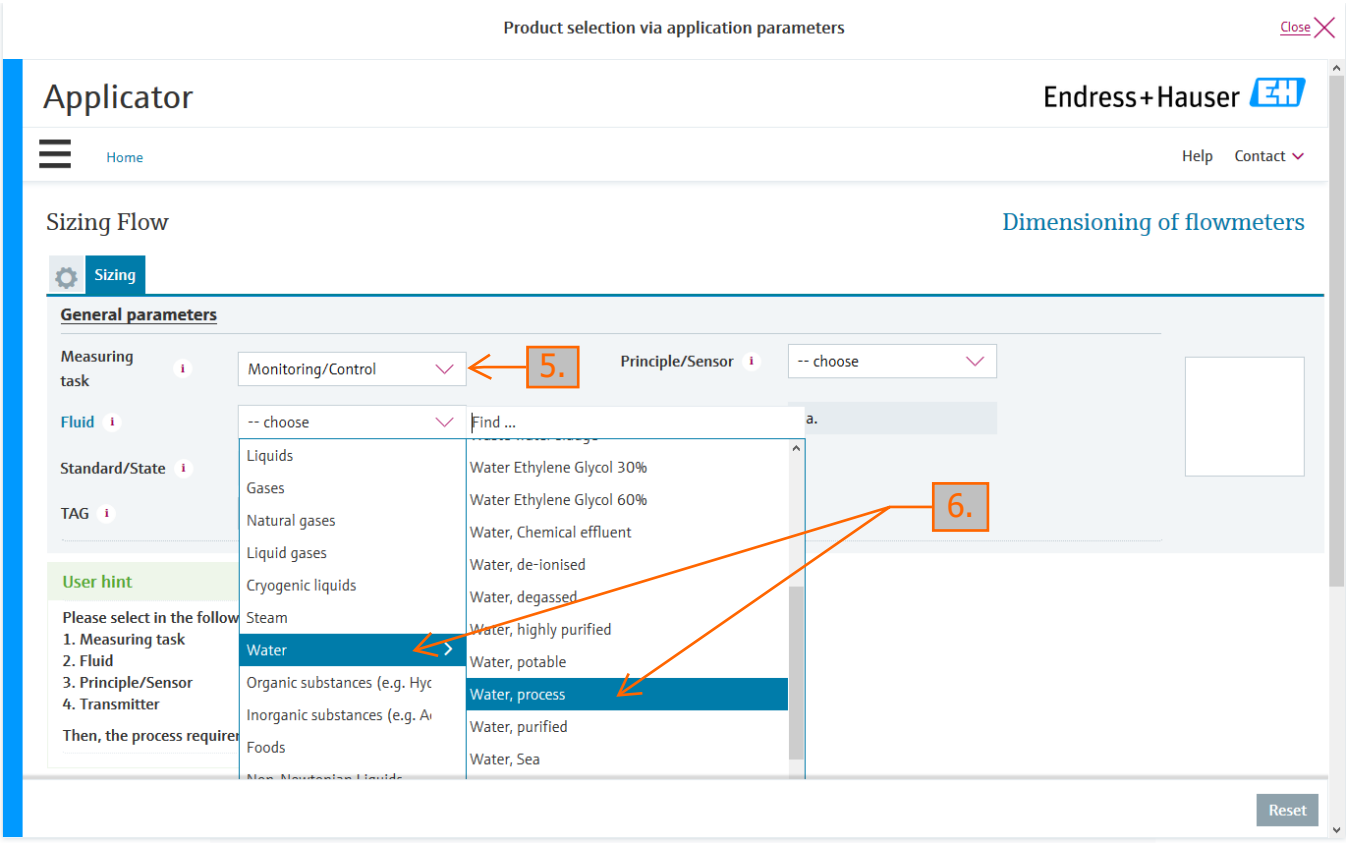
4. Select 'Liquids/Gas/Steam'



# Sizing of Hot Water Meters

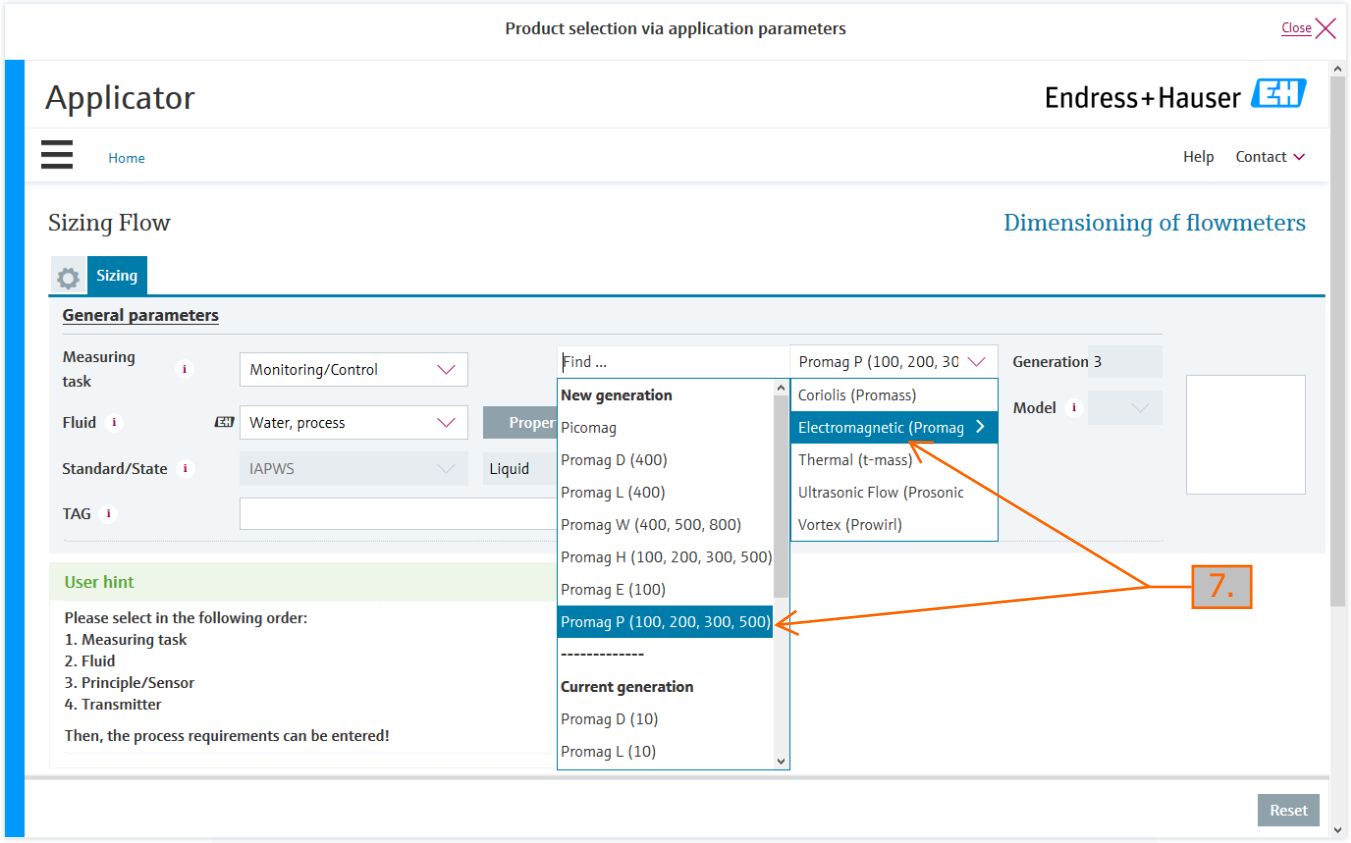
5. Select 'Monitoring/Control' under 'Measuring task'

6. Select 'Water' and then 'Water, process' under 'Fluid'



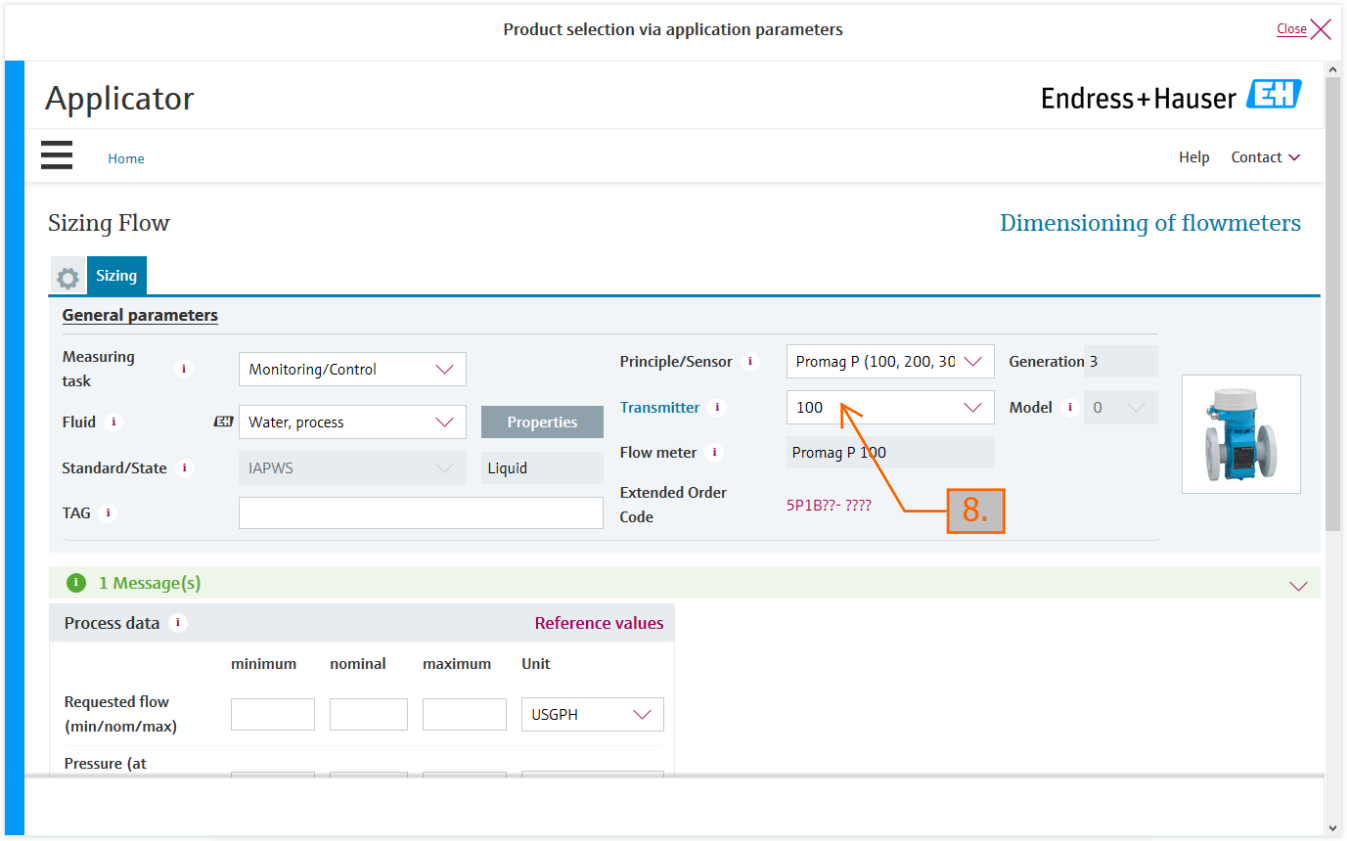
# Sizing of Hot Water Meters

7. Select 'Electromagnetic (Promag' and then 'Promag P (100, 200, 300, 500)' under 'Principle/Sensor'



# Sizing of Hot Water Meters

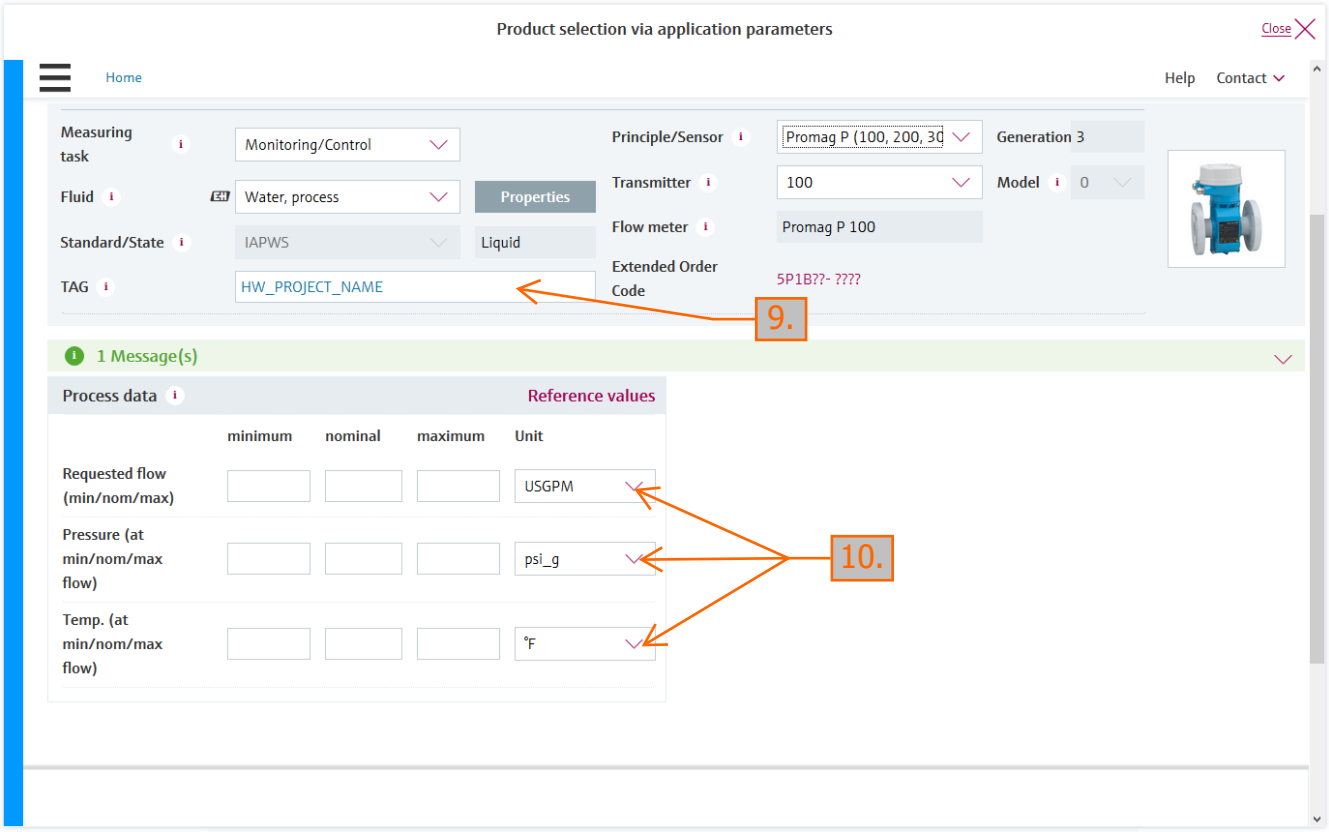
8. Select '100' under 'Transmitter'



## Sizing of Hot Water Meters

9. In the 'TAG', write the name of the project preceded by HW that stands for Hot Water.

10. Selection of units: USGPM for flow, 'psi_g' for pressure, and '°F' for temperature.

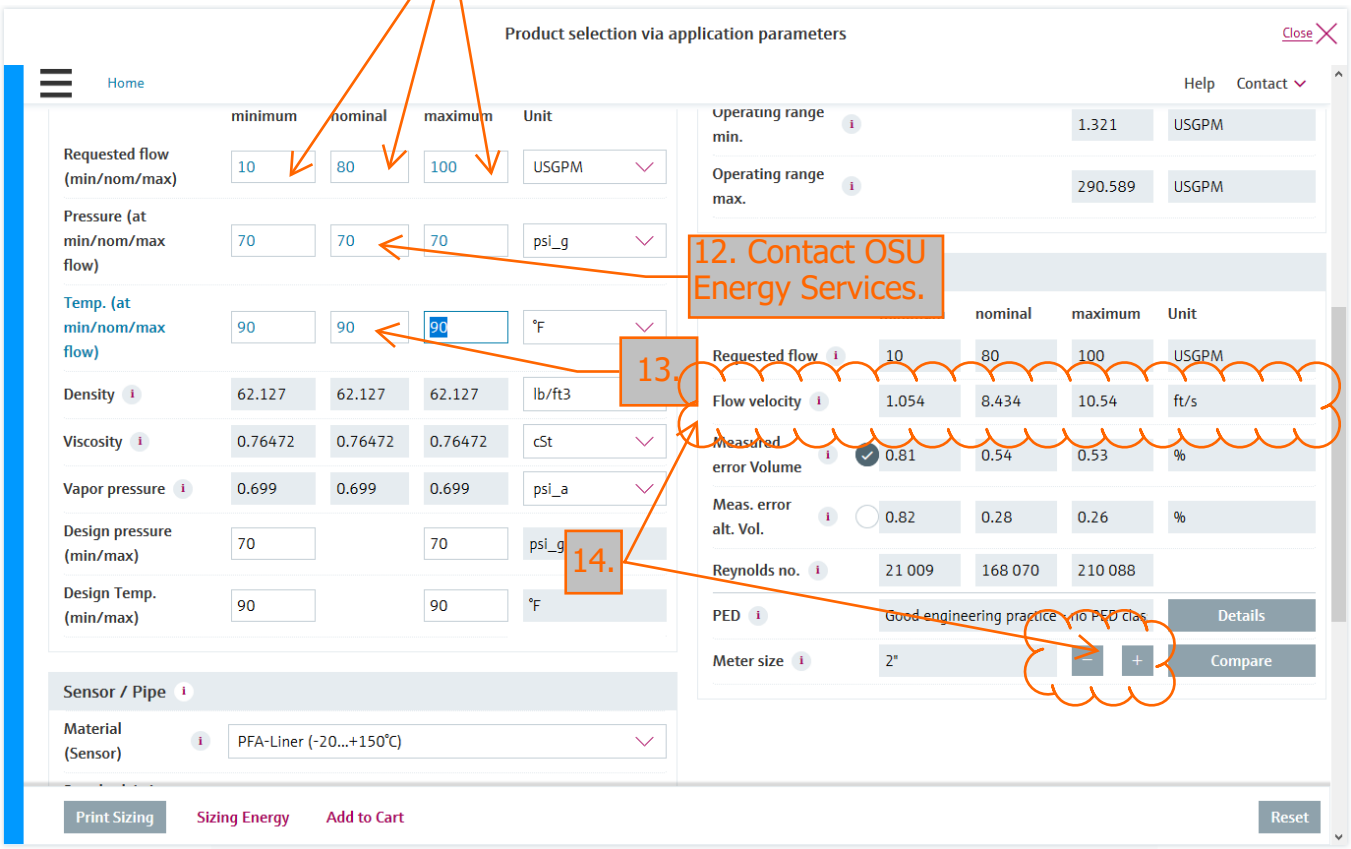


## Sizing of Hot Water Meters

11. Using the peak flow, fill the 'Requested flow' cells: minimum, nominal, and maximum.

Maximum = Peak Flow
Minimum = 10% of peak flow
Nominal = 80% of peak flow

Example: hot water peak flow = 100 gpm (designer)
Minimum = 10 gpm
Nominal = 80 gpm
Maximum = 100 gpm




12. Contact OSU Utilities Engineering in order to obtain the nominal pressure. It depends on the location of the project.

13. The nominal temperature used for sizing hot water (HW) meters is 90 °F.

14. Verify 'Flow velocity' stays into the range between 3.3 and 8.2 ft/s. Change the 'Meter size' if it is necessary to keep the 'Flow velocity' in this range.

**From this point, please follow steps 15 through 18 of the "Sizing Domestic Water" document.**