Technical Note

High Technology Sensors

Ez-Track R10/R16 Float Selection & Specific Gravity Guide

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The Ez-Track R10 has 2 standard floats options and R16 has 5 standard floats offerings. These floats vary in size, material, finish and specific gravity. Application considerations determine the proper float selection. Most liquid level applications will require a R16 style transducer with its .01" resolution being adequate for these applications. However, there are applications where the R10 may be required with its .001" resolution. It is important to note that the R10 transducer is not intrinsically safe and would not be practical for many level applications.

R10 STANDARDS FLOATS:

Float Kit	Material	Diameter	Height	Finish	Specific Gravity
MF-R10	316 Stainless	1.610"	1.295"	Standard	0.66
EF-R10	316 Stainless	2.050"	2.000"	Standard	0.62

R16 STANDARD FLOATS:

Float Kit	Material	Diameter	Height	Finish	Specific Gravity
FK-R16-205-SSES	316 Stainless	2.050"	2.710"	Standard	0.54
FK-R16-183-SSES	316 Stainless	1.830"	2.940"	Standard	0.61
FK-R16-202-NSH	316 Stainless	2.020"	2.710"	Standard	0.40
FK-R16-207-PPS	PVDF	2.070"	2.400"	Standard	0.65
FK-R16-207-SSFE	316 Stainless	1.830"	2.940"	Food Grade (180 Grit)	0.61

The inside diameter of the stainless steel floats are 0.720", the inside diameter of the PVDF is 0.660". Floats with smaller outer diameters would not be practical as the outside diameter of the transducer is 5/8".

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SPECIFIC GRAVITY:

Specific gravity is defined as the ratio of the density of a liquid compared to the density of pure water at a specific temperature. Specific Gravity is dimensionless unit.

Specific Gravity can be expressed as:

$$SG = \rho / \rho_{H2O}$$

where

SG = specific gravity

ρ = density of fluid

ρ_{H2O} = density of water

It is common to use the density of water at 4 °C (39° F) as reference - at this point the density of water is at the highest.

SELECTING A FLOAT:

When selecting a float the first consideration should be the chemical compatibility of the float material (see tech note on chemical compatibility #XXXX). Typically the material will be the same as the transducers material.

We should then determine the maximum diameter of the float based on the opening available in the customer's tank.

Finally we need to determine the maximum specific gravity of the float based on the customer's liquid. The customer should provide you with the specific gravity of the liquid. If the customer does not have that number, refer to the web-site below to assist you in your selection.

The specific gravity of the float should be 10% less than the specific gravity of the liquid being measured.

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Example:

For Butane (0.601 *SG*), the floats maximum specific gravity would be 0.540 *SG* any higher, and the float will sink.

SPECIFIC GRAVITY of COMMON LIQUIDS:

http://www.engineeringtoolbox.com/24_336.html

Fluid	**Temperature (°C)**	**Specific Gravity *SG***
Acetic Acid Acetone	25	1.052
Alcohol, ethyl	25	0.787
Alcohol, methyl	25	0.789
Alcohol, propyl	25	0.802
Ammonia (aqua)	25	0.826
Benzene	25	0.876
Bromine	25	3.12
Butane	25	0.601
Carbon tetrachloride	25	1.589
Chloride	25	1.56
Citric acid	25	1.665
Fuel oil	60°F	0.893
Gasoline, natural	60°F	0.713
Gasoline, Vehicle	60°F	0.739
Kerosene	60°F	0.820
Methane	-164	0.466
Milk		1.035
Octane		0.921
Pentane	25	0.755
Propane	-40	0.585
Propylene	25	0.516
Water, pure	212°F	1.000