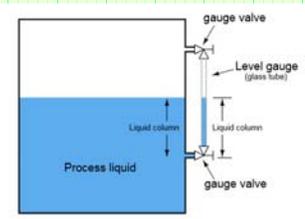
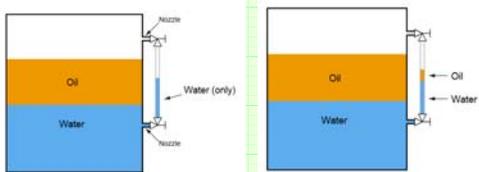
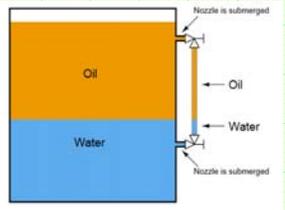
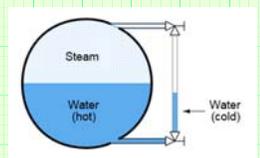


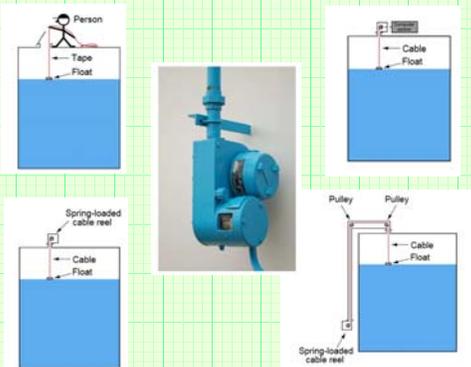
		1
<h1 style="margin: 0;">Level Measurement</h1> <p style="margin: 0;">Daniel Kohn University of Memphis TECH 3821 Fall 2015</p>		

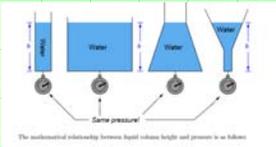
	Sightglass	2
	<ul style="list-style-type: none"> A level gauge, or sightglass is nothing more than a clear tube through which process liquid may be seen. 	
		

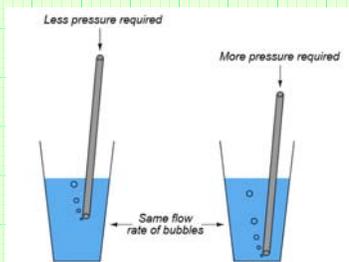
	Sightglass	3
	<ul style="list-style-type: none"> Interface Problems - a lighter liquid layer existing between the connection ports of the gauge. If a lighter (less dense) liquid exists above a heavier (denser) liquid in the process vessel, the level gauge may not show the proper interface 	
		

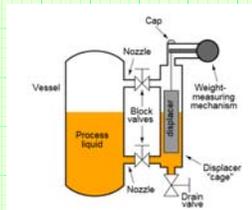
	Sightglass	4
○	<ul style="list-style-type: none"> The only way to ensure proper two-part liquid interface level indication in a sightglass is to keep both ports (nozzles) submerged 	
○		

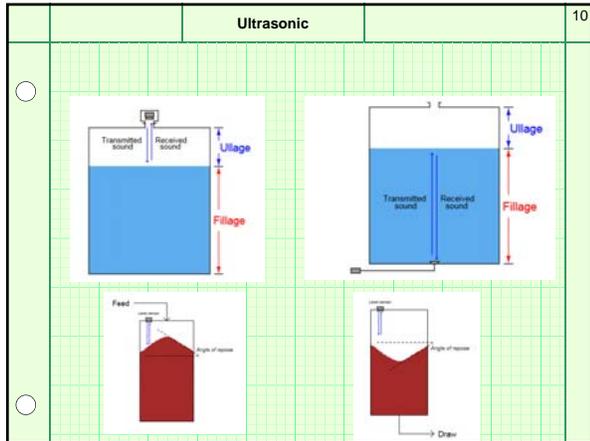
	Sightglass	5
○	<ul style="list-style-type: none"> Temperature Problem -when the liquid inside the vessel is substantially hotter than the liquid in the gauge, causing the densities to be different. 	
○		

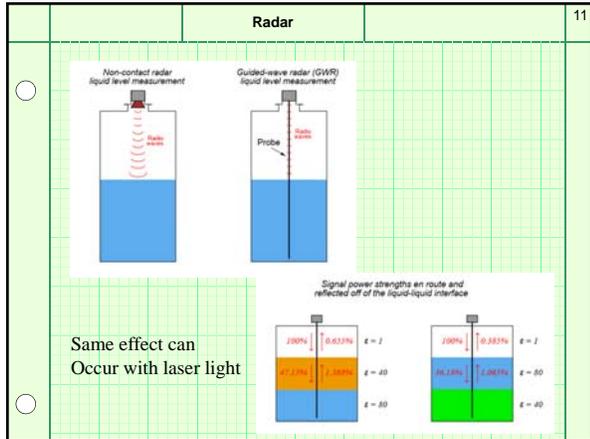
	Floats	6
○		
○		

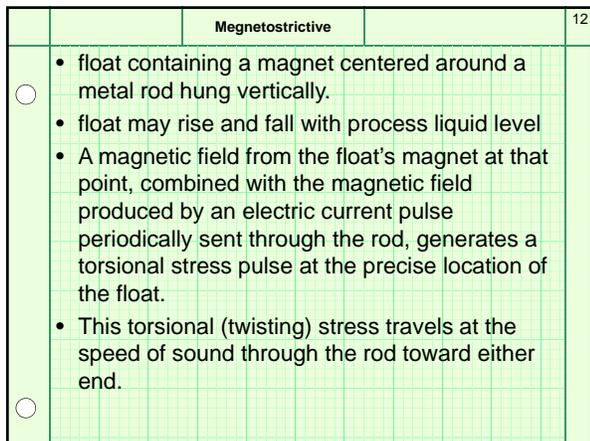
	Hydrostatic Pressure	7
○	<ul style="list-style-type: none"> A vertical column of fluid generates a pressure at the bottom of the column owing to the action of gravity on that fluid. The greater the vertical height of the fluid, the greater the pressure, all other factors being equal. This principle allows us to infer the level (height) of liquid in a vessel by pressure measurement. 	
○	 <p>The mathematical relationship between liquid column height and pressure is as follows: $P = \rho gh$</p> <p>Where: P = Hydrostatic pressure ρ = Mass density of fluid in kilograms per cubic meter (metric) or slugs per cubic foot (British) g = Acceleration of gravity h = Height density of fluid in meters per cubic meter (metric) or pounds per cubic foot (British) h = Height of vertical fluid column above point of pressure measurement.</p>	

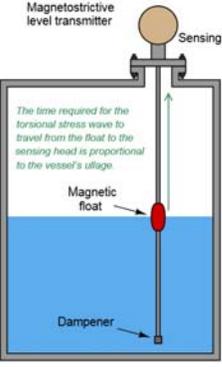
	Bubbler	8
○	<ul style="list-style-type: none"> use of a purge gas to measure hydrostatic pressure in a liquid-containing vessel Aka bubble tube or dip tube system 	
○		

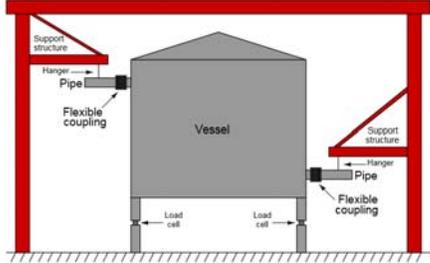
	Displacement	9
○	<ul style="list-style-type: none"> Displacer level instruments exploit Archimedes' Principle to detect liquid level by continuously measuring the weight of an object (called the displacer) immersed in the process liquid. Aka buoyant-force instrument 	
○		







		13
	<p>Magnetostrictive level transmitter</p> 	

	Weight	14
<ul style="list-style-type: none"> Weight-based level instruments sense process level in a vessel by directly measuring the weight of the vessel 		

	Capacitive	15
<ul style="list-style-type: none"> Capacitive level instruments measure electrical capacitance of a conductive rod inserted vertically into a process vessel. As process level increases, capacitance increases between the rod and the vessel walls, causing the instrument to output a greater signal. 	