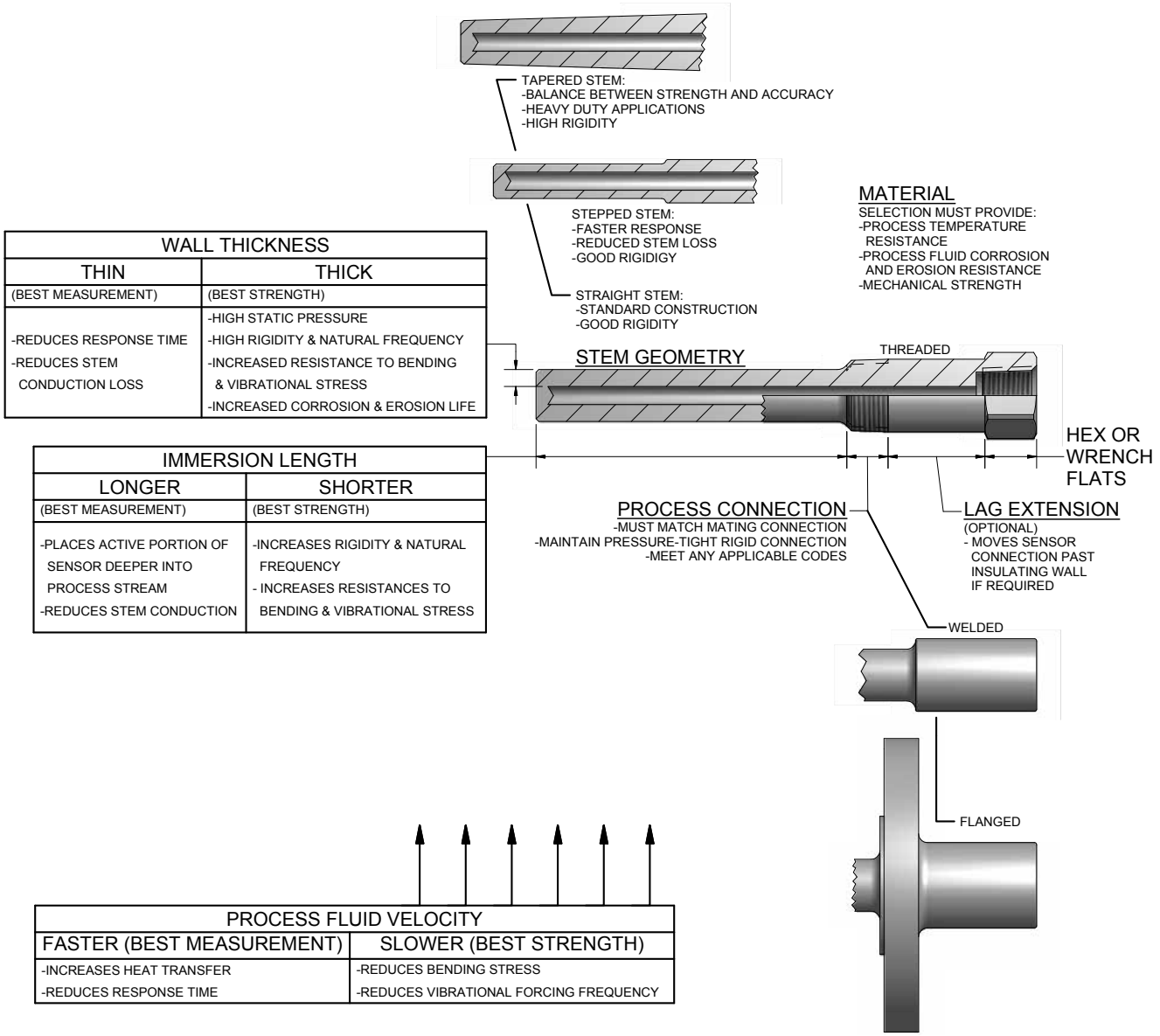
Thermowell Design and Selection Criteria

A thermowell is a pressure-tight receptacle that protects and extends the life of a temperature sensor in processing applications where the sensor is not mechanically or chemically compatible with the process environment. Installed directly into the piping systems, thermowells facilitate sensor replacement in high-pressure pipelines and eliminate the need to interrupt the process flow or drain the process system for sensor maintenance functions. The use of standardized thermowells permits simple relocation of sensors throughout a plant.

Strength versus accurate and fast temperature measurement is a balancing act. The factors which tend to produce high strength also tend to reduce the temperature sensor's accuracy and speed of response. A properly selected thermowell will balance these opposing factors to produce a design capable of functioning satisfactorily in the intended application. The listed factors are a general guide and are not all inclusive. Refer to ASME PTC 19.3 TW for a more authoritative dissertation on proper thermowell selection.



WALL THICKNESS	
THIN	THICK
(BEST MEASUREMENT)	(BEST STRENGTH)
-REDUCES RESPONSE TIME -REDUCES STEM CONDUCTION LOSS	-HIGH STATIC PRESSURE -HIGH RIGIDITY & NATURAL FREQUENCY -INCREASED RESISTANCE TO BENDING & VIBRATIONAL STRESS -INCREASED CORROSION & EROSION LIFE

IMMERSION LENGTH	
LONGER	SHORTER
(BEST MEASUREMENT)	(BEST STRENGTH)
-PLACES ACTIVE PORTION OF SENSOR DEEPER INTO PROCESS STREAM -REDUCES STEM CONDUCTION	-INCREASES RIGIDITY & NATURAL FREQUENCY - INCREASES RESISTANCES TO BENDING & VIBRATIONAL STRESS

PROCESS FLUID VELOCITY	
FASTER (BEST MEASUREMENT)	SLOWER (BEST STRENGTH)
-INCREASES HEAT TRANSFER -REDUCES RESPONSE TIME	-REDUCES BENDING STRESS -REDUCES VIBRATIONAL FORCING FREQUENCY