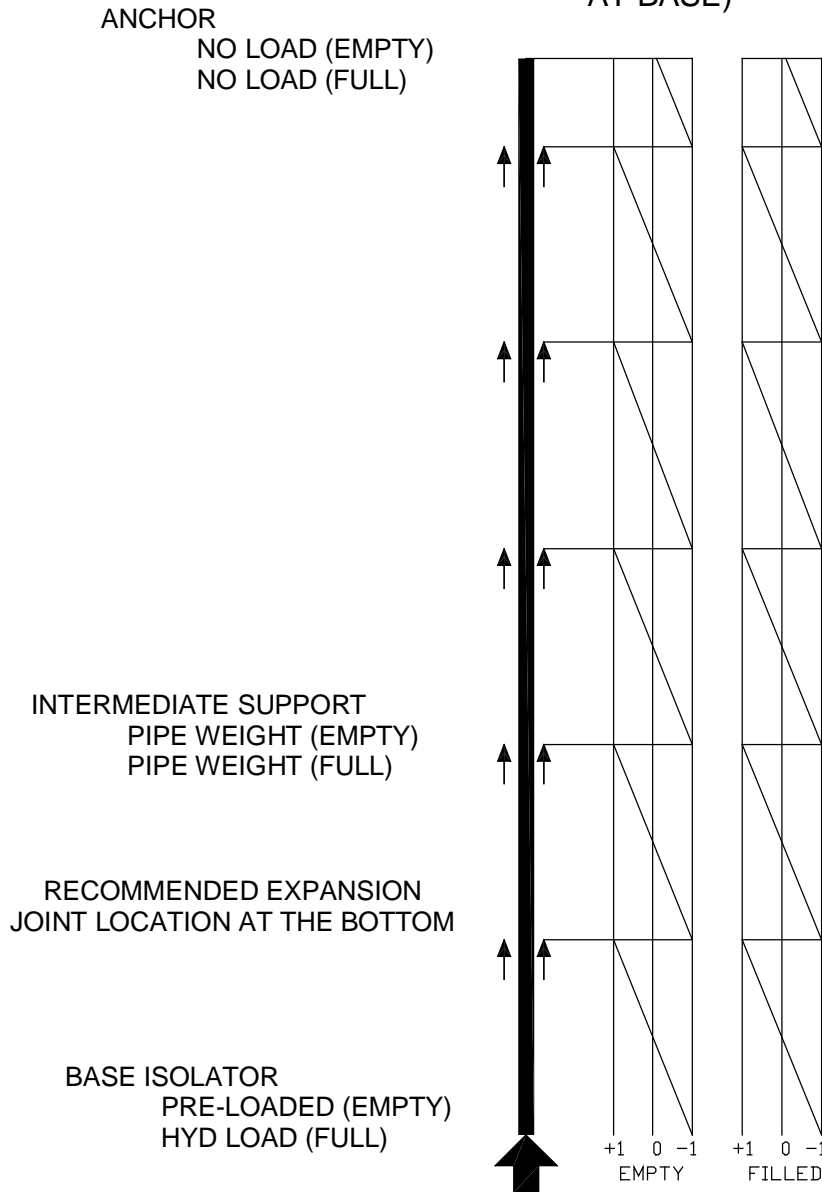


# WELDED OR BOLTED FLANGE PIPE RISER (TOP RESTRAINED)

(ANCHORED AT TOP WITH NON-RESTRAINED SPRING INTERMEDIATE SUPPORTS AND VERTICALLY RESTRAINED SPRING ISOLATOR AT BOTTOM – WATER LOAD AT BASE)

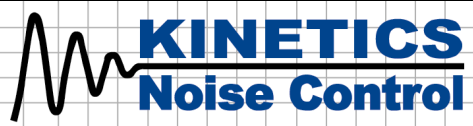


RELATIVE PIPE STRESS ASSUMING PIPE WT/FT AND WATER WT/FT IS APPROXIMATELY EQUAL (12' STD WT PIPE)

USE WITH CAUTION ON EXPANSIVE SYSTEMS  
DO NOT USE FOR CONTRACTIVE SYSTEMS

## CONC HYD LOAD / TOP RESTRAINED / SOLID COUPLING - TYPE 1

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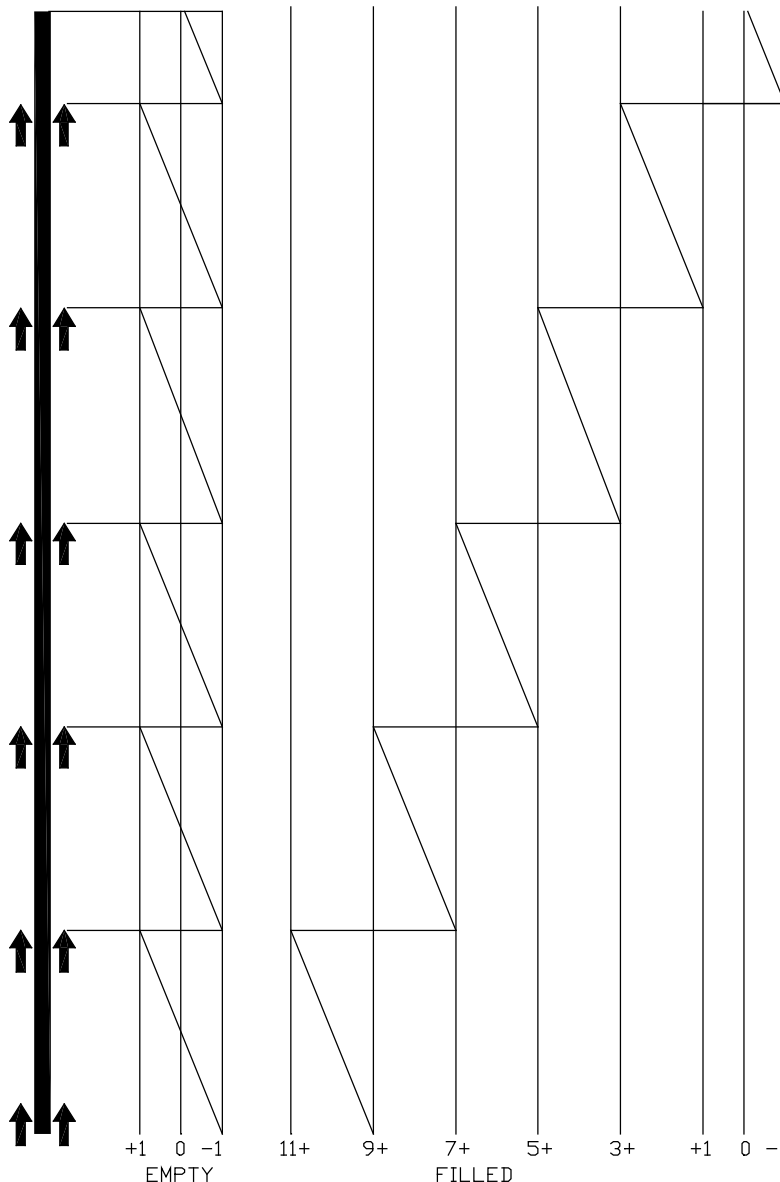
# WELDED OR BOLTED FLANGE PIPE RISER (TOP RESTRAINED)

(ANCHORED AT TOP WITH VERTICALLY RESTRAINED SPRING PIPE SUPPORTS AT BASE AND INTERMEDIATE LOCATIONS – WATER LOAD DISTRIBUTED)

ANCHOR  
NO LOAD (EMPTY)  
NO LOAD (FULL)

INTERMEDIATE AND BOTTOM  
SUPPORT  
PIPE WEIGHT + PRE-LOAD (EMPTY)  
PIPE WEIGHT + LOCAL  
WATER WEIGHT (FULL)

RECOMMENDED  
EXPANSION JOINT  
LOCATION AT THE BOTTOM



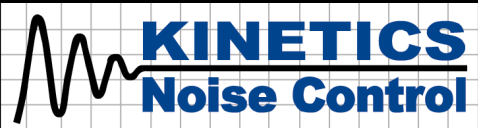
RELATIVE PIPE STRESS ASSUMING PIPE WT/FT AND WATER WT/FT IS APPROXIMATELY EQUAL (12' STD WT PIPE)

OK FOR EXPANSIVE SYSTEMS  
DO NOT USE FOR CONTRACTIVE SYSTEMS

KINETICS™ Riser Design Manual

## DIST HYD LOAD / TOP RESTRAINED / SOLID COUPLING - TYPE 2

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