

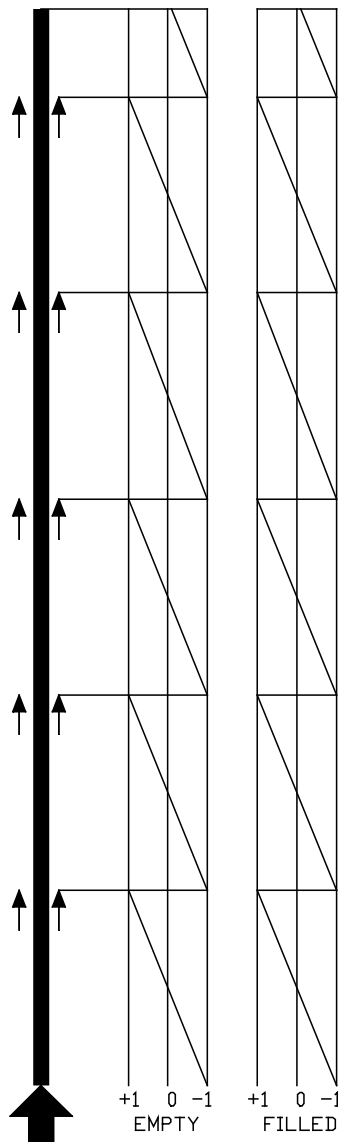
WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

(ANCHORED AT BASE WITH NON-RESTRAINED SPRING INTERMEDIATE PIPE SUPPORTS – WATER LOAD AT BASE)

RECOMMENDED EXPANSION
JOINT LOCATION AT THE TOP

INTERMEDIATE SUPPORT
PIPE WEIGHT (EMPTY)
PIPE WEIGHT (FULL)

ANCHOR
NO LOAD (EMPTY)
HYD LOAD (FULL)



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

OK FOR EXPANSIVE OR CONTRACTIVE SYSTEMS

KINETICS™ Riser Design Manual

CONC HYD LOAD / BASE RESTRAINED / SOLID COUPLING - TYPE 1

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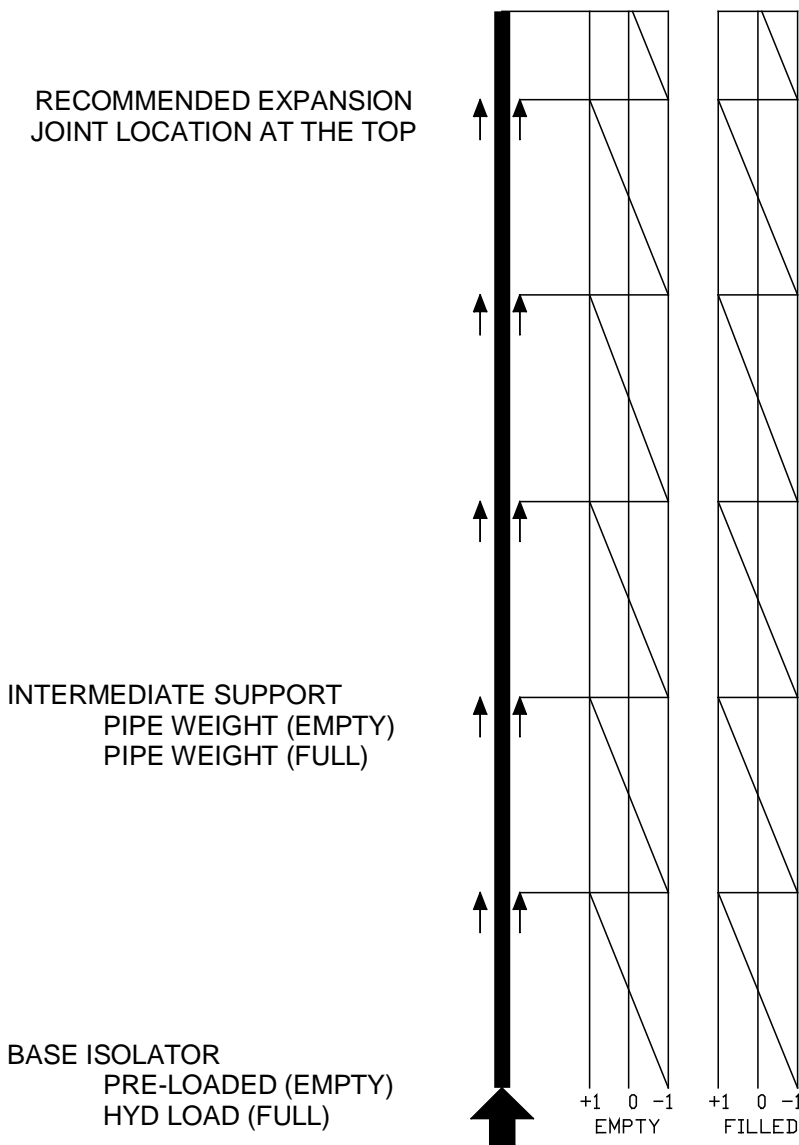
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WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

(HIGH CAPACITY VERTICALLY RESTRAINED SPRING ISOLATOR AT BASE WITH NON-RESTRAINED SPRING INTERMEDIATE SUPPORTS- WATER LOAD AT BASE)

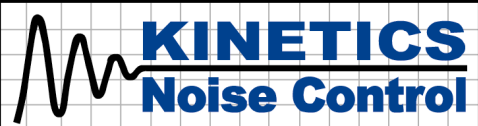


RELATIVE PIPE STRESS ASSUMING PIPE WT/FT AND WATER WT/FT IS APPROXIMATELY EQUAL (12" STD WT PIPE)

OK FOR EXPANSIVE OR CONTRACTIVE SYSTEMS

CONC HYD LOAD / BASE RESTRAINED / SOLID COUPLING - TYPE 2

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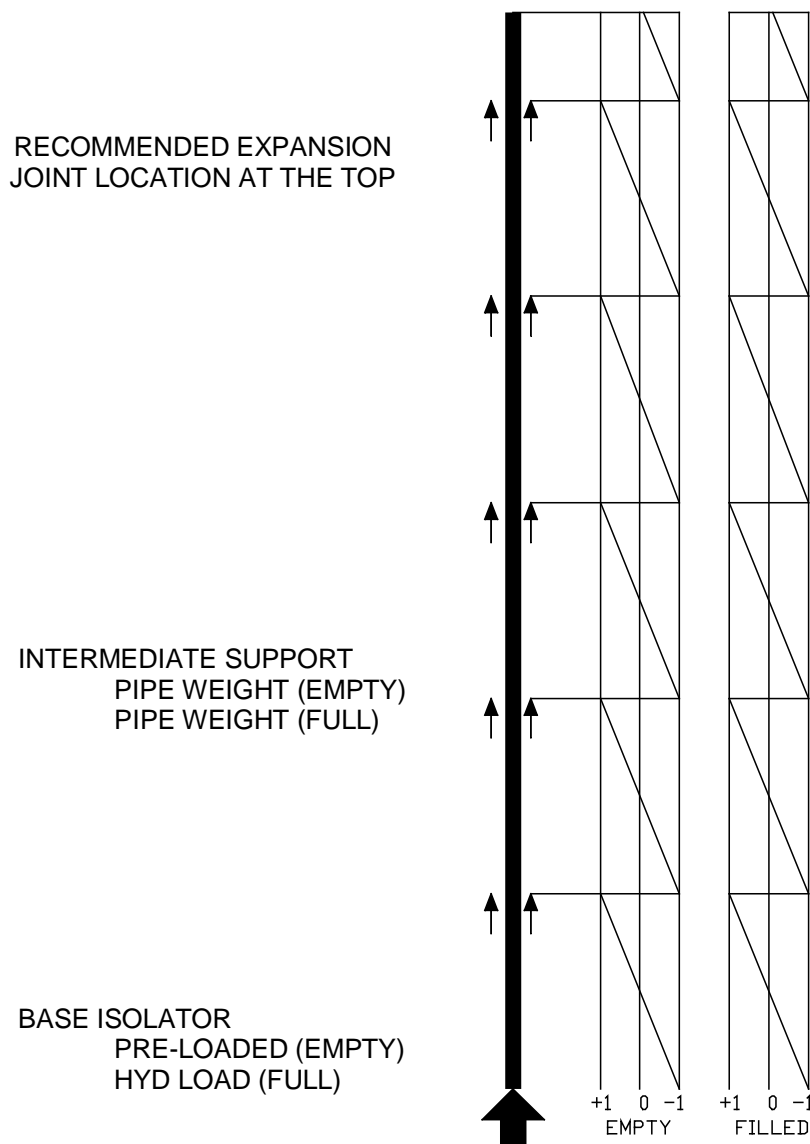
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WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

(HIGH CAPACITY VERTICALLY RESTRAINED SPRING ISOLATOR AT BASE WITH VERTICALLY RESTRAINED SPRING INTERMEDIATE SUPPORTS – WATER LOAD AT BASE)

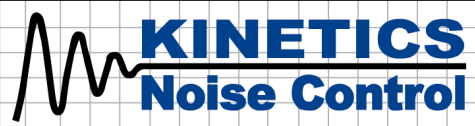


RELATIVE PIPE STRESS ASSUMING PIPE WT/FT AND WATER WT/FT IS APPROXIMATELY EQUAL (12" STD WT PIPE)

OK FOR CONTRACTIVE SYSTEMS
USE WITH CAUTION ON EXPANSIVE SYSTEMS

CONC HYD LOAD / BASE RESTRAINED / SOLID COUPLING- TYPE 3

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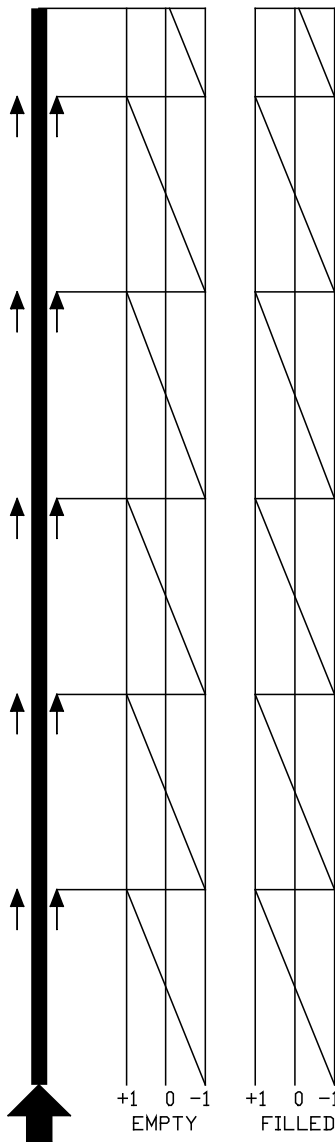
WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

(ANCHOR AT BASE WITH VERTICALLY RESTRAINED SPRING INTERMEDIATE SUPPORTS – WATER LOAD AT BASE)

RECOMMENDED EXPANSION
JOINT LOCATION AT THE TOP

INTERMEDIATE SUPPORT
PIPE WEIGHT (EMPTY)
PIPE WEIGHT (FULL)

ANCHOR
NO LOAD (EMPTY)
HYD LOAD (FULL)

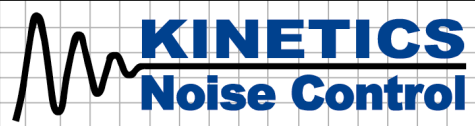


RELATIVE PIPE STRESS ASSUMING PIPE WT/FT AND WATER WT/FT IS
APPROXIMATELY EQUAL (12" STD WT PIPE)

OK FOR CONTRACTIVE SYSTEMS
DO NOT USE FOR EXPANSIVE SYSTEMS

CONC HYD LOAD / BASE RESTRAINED / SOLID COUPLING- TYPE 4

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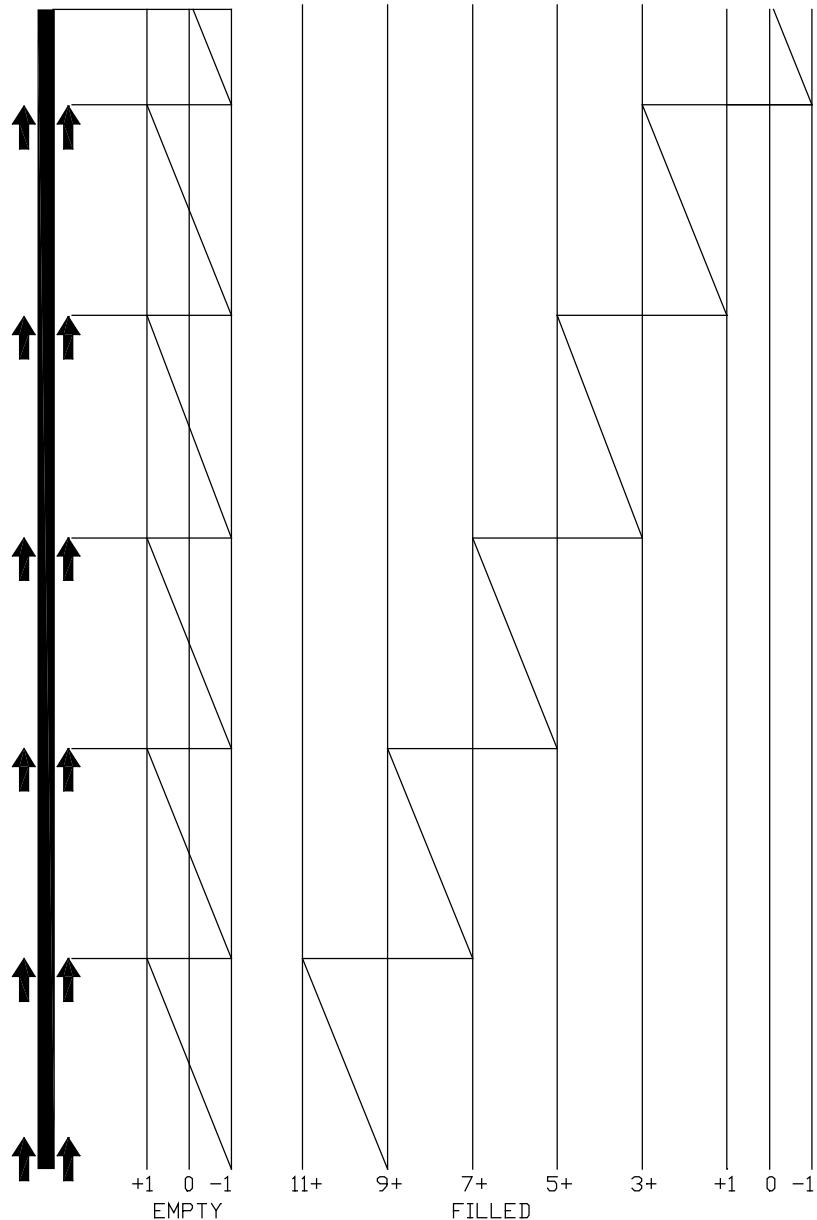
WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

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

RECOMMENDED
EXPANSION JOINT
LOCATION AT THE TOP

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

ANCHOR
PIPE WEIGHT (EMPTY)
PIPE WEIGHT + LOCAL
WATER WEIGHT (FULL)



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

OK FOR CONTRACTIVE SYSTEMS
DO NOT USE FOR EXPANSIVE SYSTEMS

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DIST HYD LOAD / BASE RESTRAINED / SOLID COUPLING - TYPE 5

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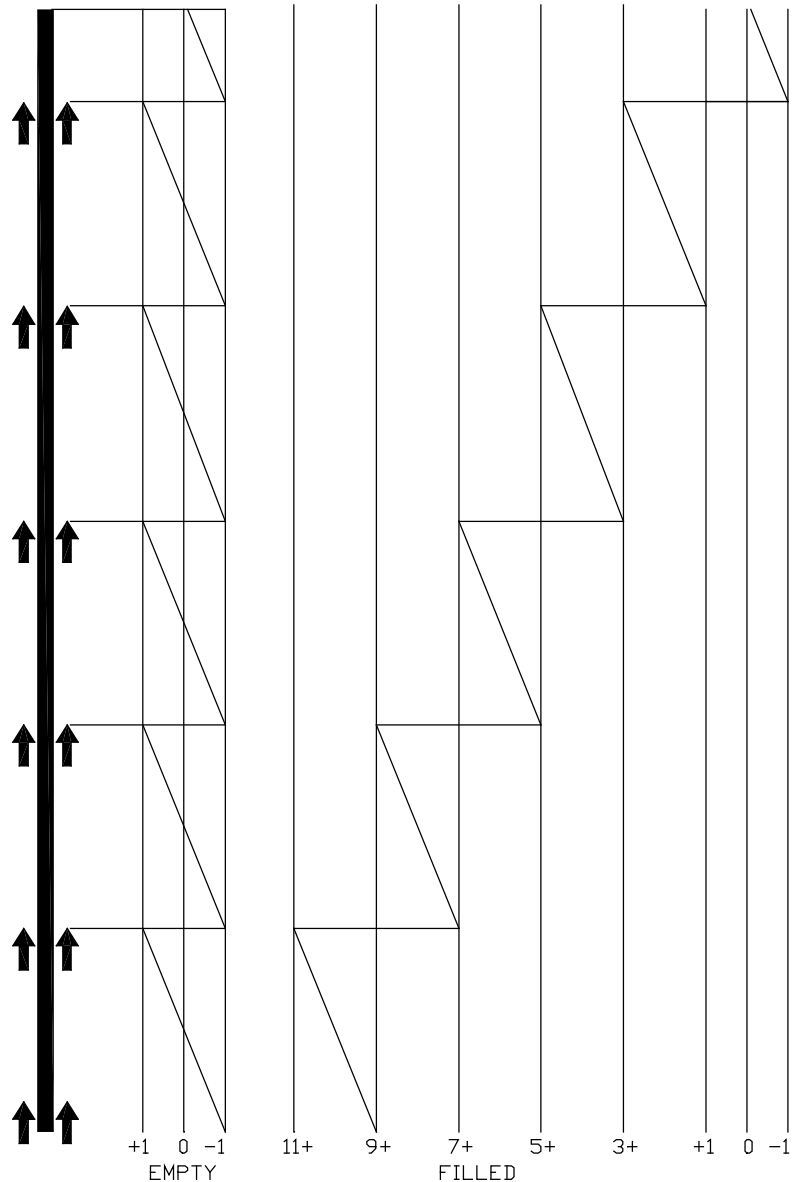
WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

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

RECOMMENDED
EXPANSION JOINT
LOCATION AT THE TOP

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

BASE ISOLATOR
PIPE WEIGHT + PRE-LOAD (EMPTY)
PIPE WEIGHT + LOCAL
WATER WEIGHT (FULL)



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

OK FOR CONTRACTIVE SYSTEMS
DO NOT USE FOR EXPANSIVE SYSTEMS

KINETICS™ Riser Design Manual

DIST HYD LOAD / BASE RESTRAINED / SOLID COUPLING - TYPE 6

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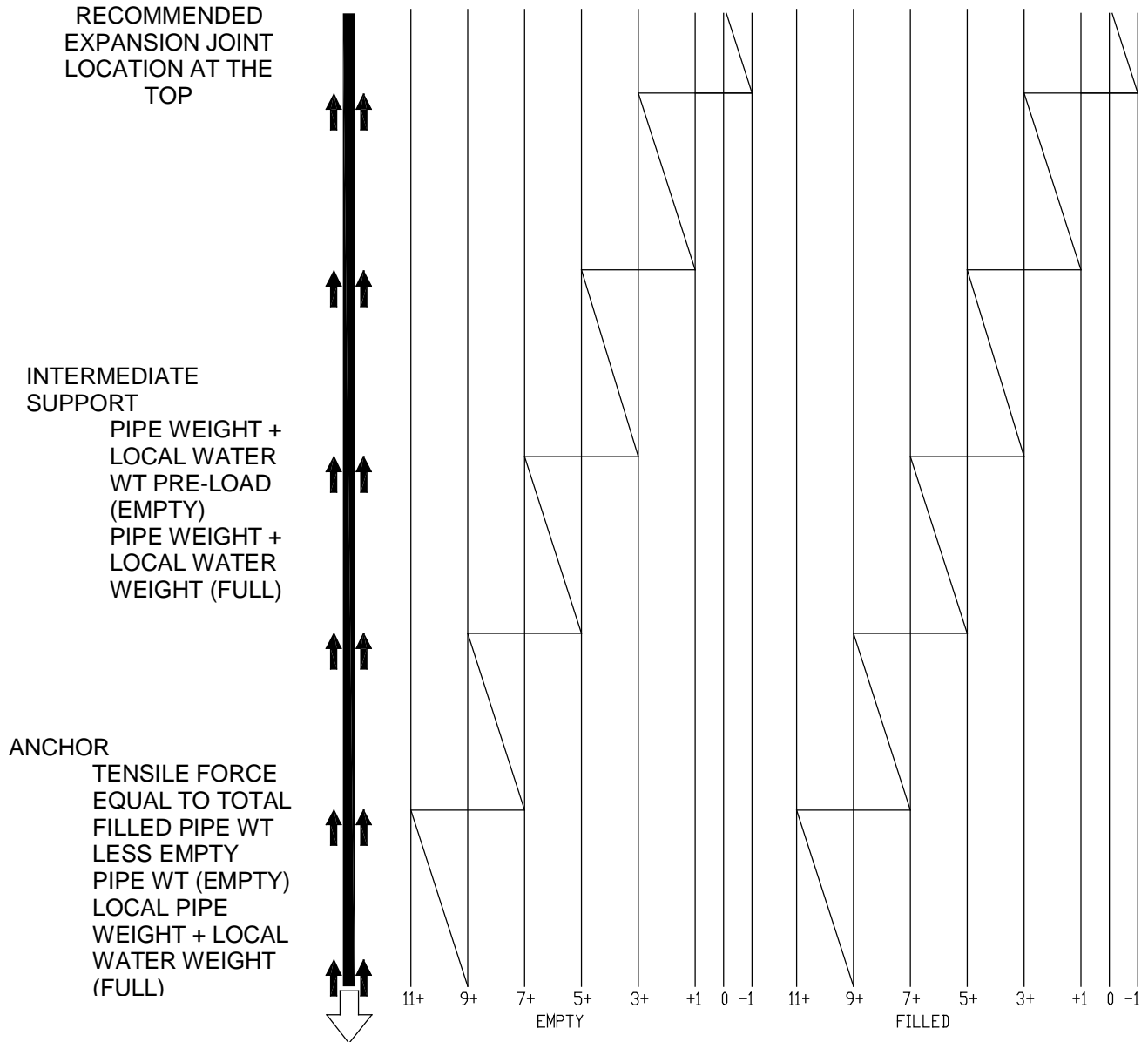
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WELDED OR BOLTED FLANGE PIPE RISER (BASE RESTRAINED)

(ANCHORED AT BASE WITH NON-RESTRAINED SPRING INTERMEDIATE PIPE SUPPORTS – WATER LOAD DISTRIBUTED)



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

OK FOR EXPANSIVE AND CONTRACTIVE SYSTEMS

DIST HYD LOAD / BASE RESTRAINED / SOLID COUPLING - TYPE 7

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