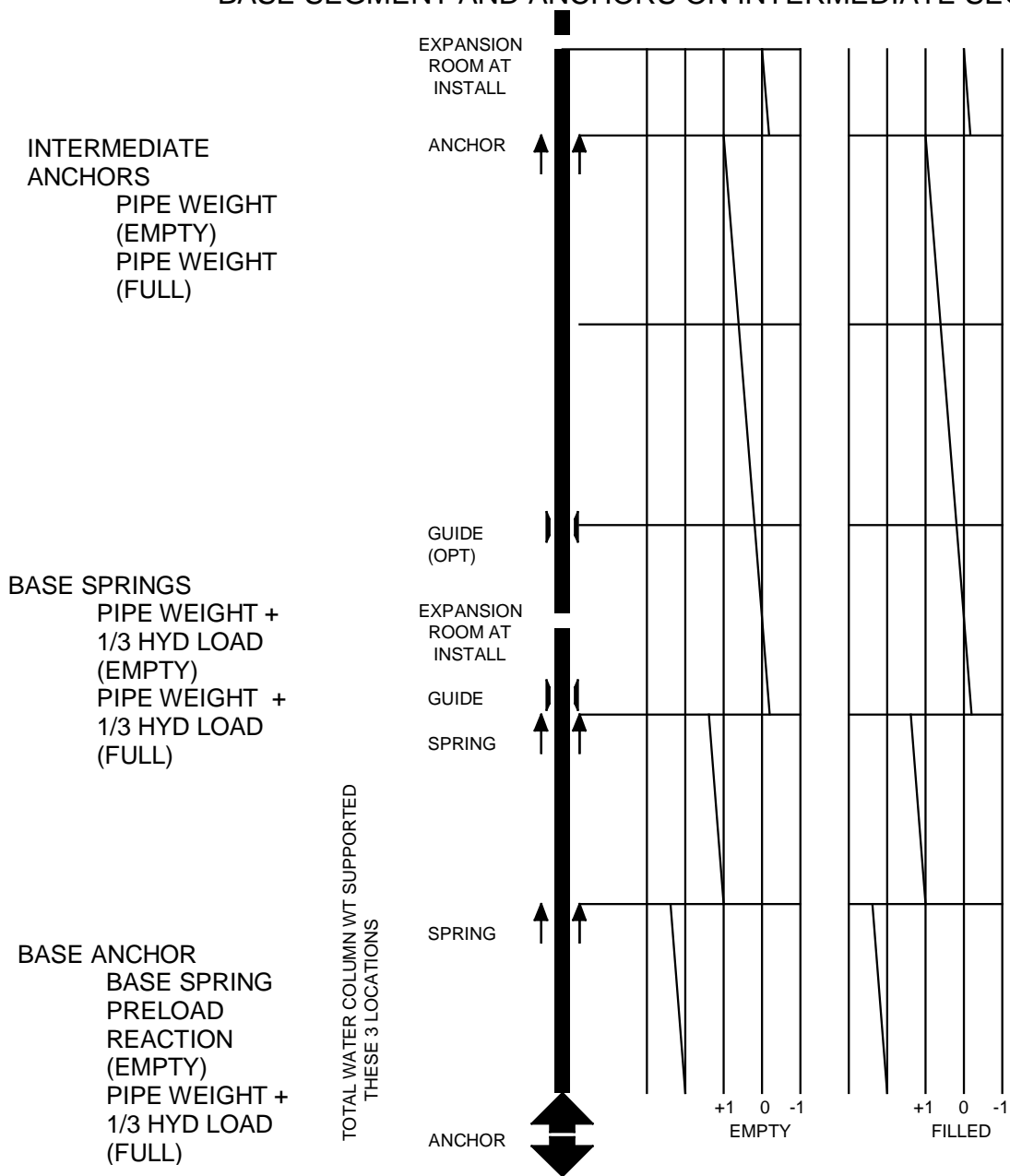


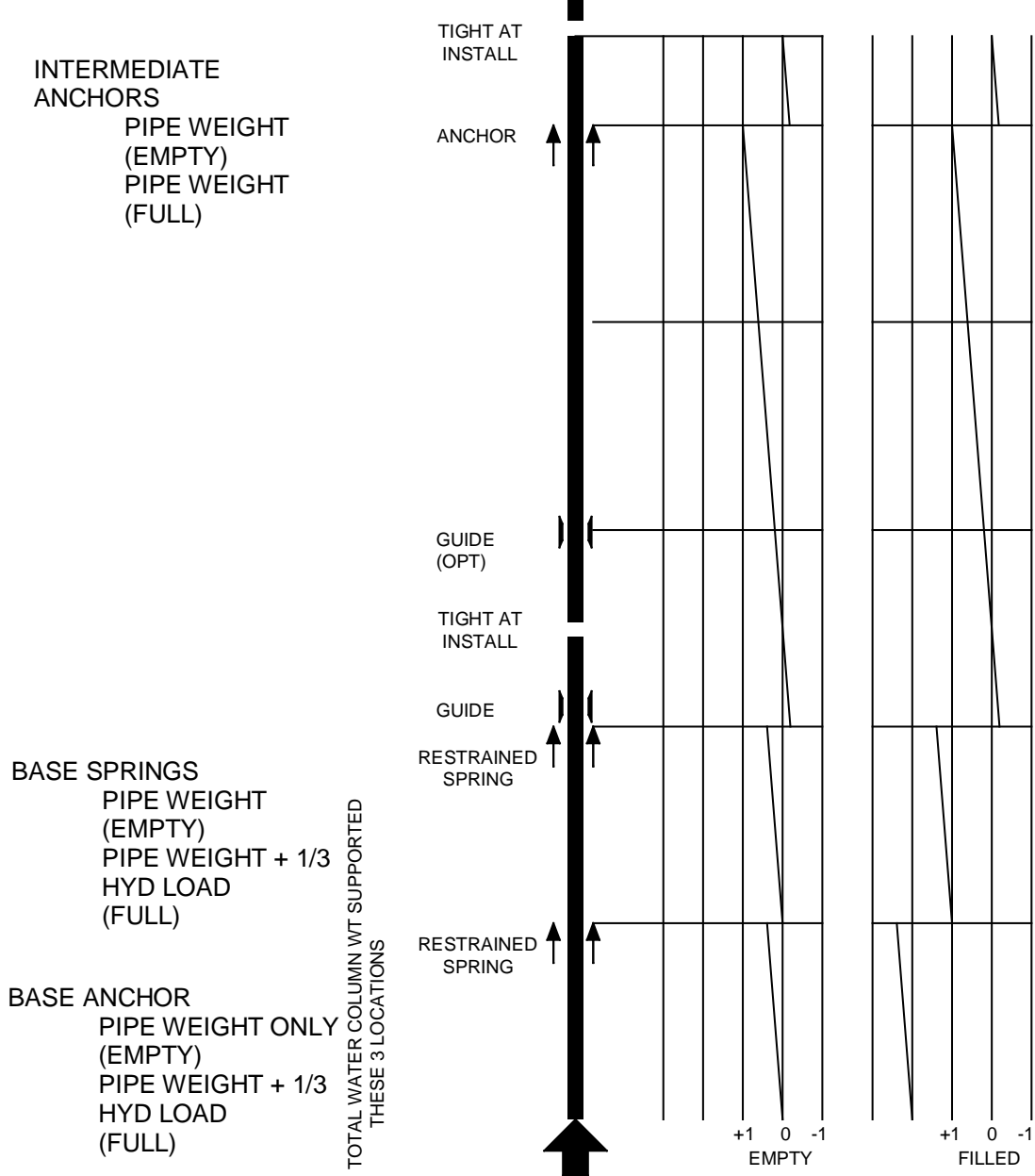
PIPE RISER WITH CLEARANCE COUPLINGS (MULTIPLE RESTRAINTS)

ANCHORED AT BASE WITH NON-RESTRAINED SPRING SUPPORTS ON
BASE SEGMENT AND ANCHORS ON INTERMEDIATE SEGMENTS



PIPE RISER WITH CLEARANCE COUPLINGS (MULTIPLE RESTRAINTS)

ANCHORED AT BASE WITH RESTRAINED SPRING SUPPORTS
ON BASE SEGMENT AND ANCHORS ON INTERMEDIATE SEGMENTS



RELATIVE PIPE STRESS EXCEPT HYD LOAD IS FUNCTION OF RISER HEIGHT
BASE ANCHOR LOADS HAVE BEEN REDUCED USING RESTRAINED SPRINGS

OK FOR CONTRACTIVE SYSTEMS
DO NOT USE FOR EXPANSIVE SYSTEMS

DISTRIBUTED HYD LOAD / MULTIPLE RESTRAINTS / CLEARANCE COUPLING - TYPE 2

PAGE 2 OF 4



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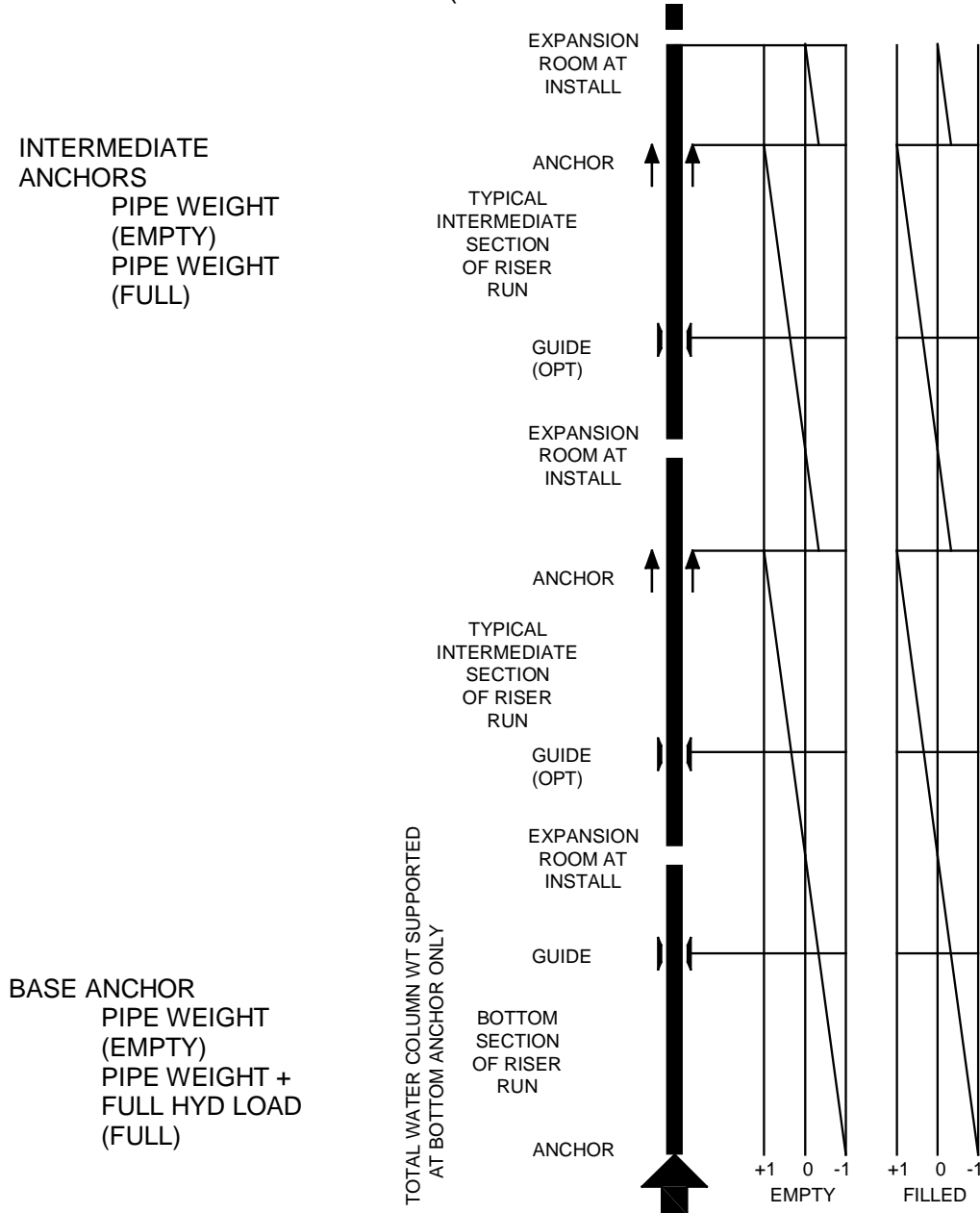
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PIPE RISER WITH CLEARANCE COUPLINGS (MULTIPLE RESTRAINTS)

ANCHORED AT BASE WITH GUIDES AND ANCHORS ON INTERMEDIATE SEGMENTS (NO COMPENSATING SUPPORTS REQUIRED)

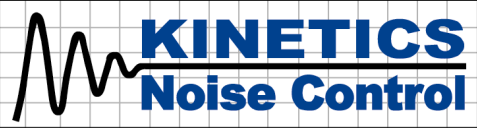


MINIMAL PIPE STRESS OCCURS AS HYD LOAD IS SUPPORTED DIRECTLY AT ANCHOR LOCATION

OK FOR EXPANSIVE SYSTEMS
DO NOT USE FOR CONTRACTIVE SYSTEMS

CONCENTRATED HYD LOAD / MULT RESTRAINTS / CLEARANCE COUPLING - TYPE 3

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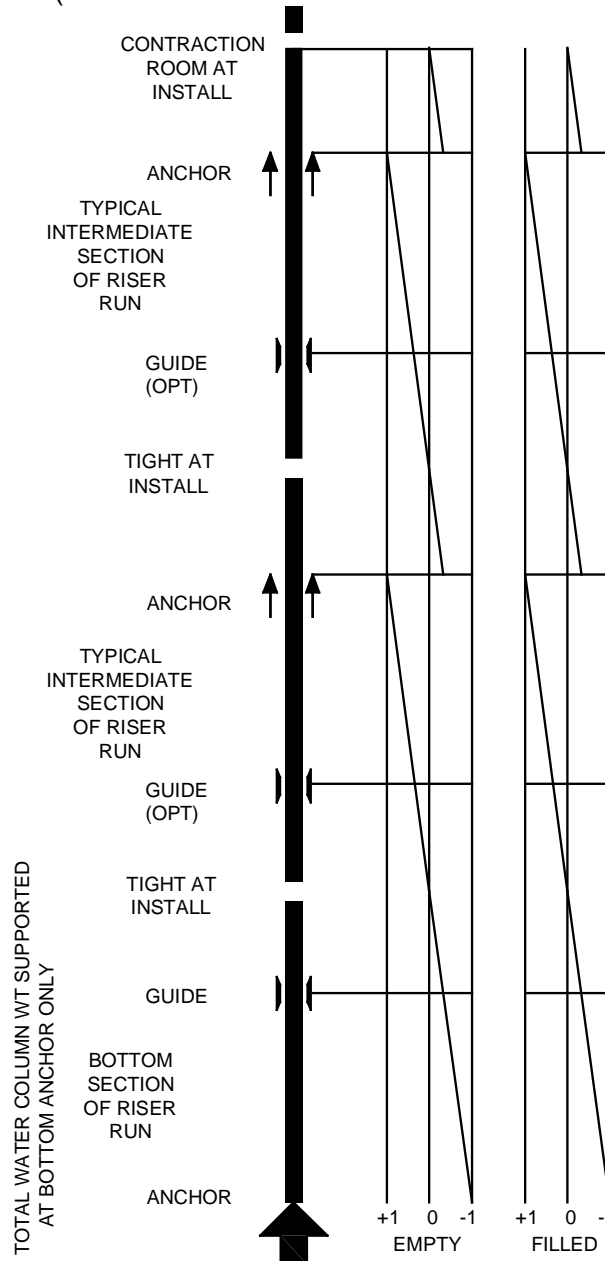
KINETICS™ Riser Design Manual

PIPE RISER WITH CLEARANCE COUPLINGS (MULTIPLE RESTRIANTS)

ANCHORED AT BASE WITH GUIDES AND ANCHORS ON INTERMEDIATE SEGMENTS (NO COMPENSATING SUPPORTS REQUIRED)

INTERMEDIATE ANCHORS

PIPE WEIGHT (EMPTY)
PIPE WEIGHT (FULL)



BASE ANCHOR

PIPE WEIGHT (EMPTY)
PIPE WEIGHT + FULL HYD LOAD (FULL)

MINIMAL PIPE STRESS OCCURS AS HYD LOAD IS SUPPORTED DIRECTLY AT ANCHOR LOCATION

OK FOR CONTRACTIVE SYSTEMS
DO NOT USE FOR EXPANSIVE SYSTEMS

KINETICS™ Riser Design Manual

DISTRIBUTED HYD LOAD / MULTIPLE RESTRAINTS / CLEARANCE COUPLING - TYPE 4
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