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SVCS-100
SEISMIC
SPECIFICATION
APPLICATION
DRAWINGS

SVCSA

SVCSA-110-1 BULLETIN

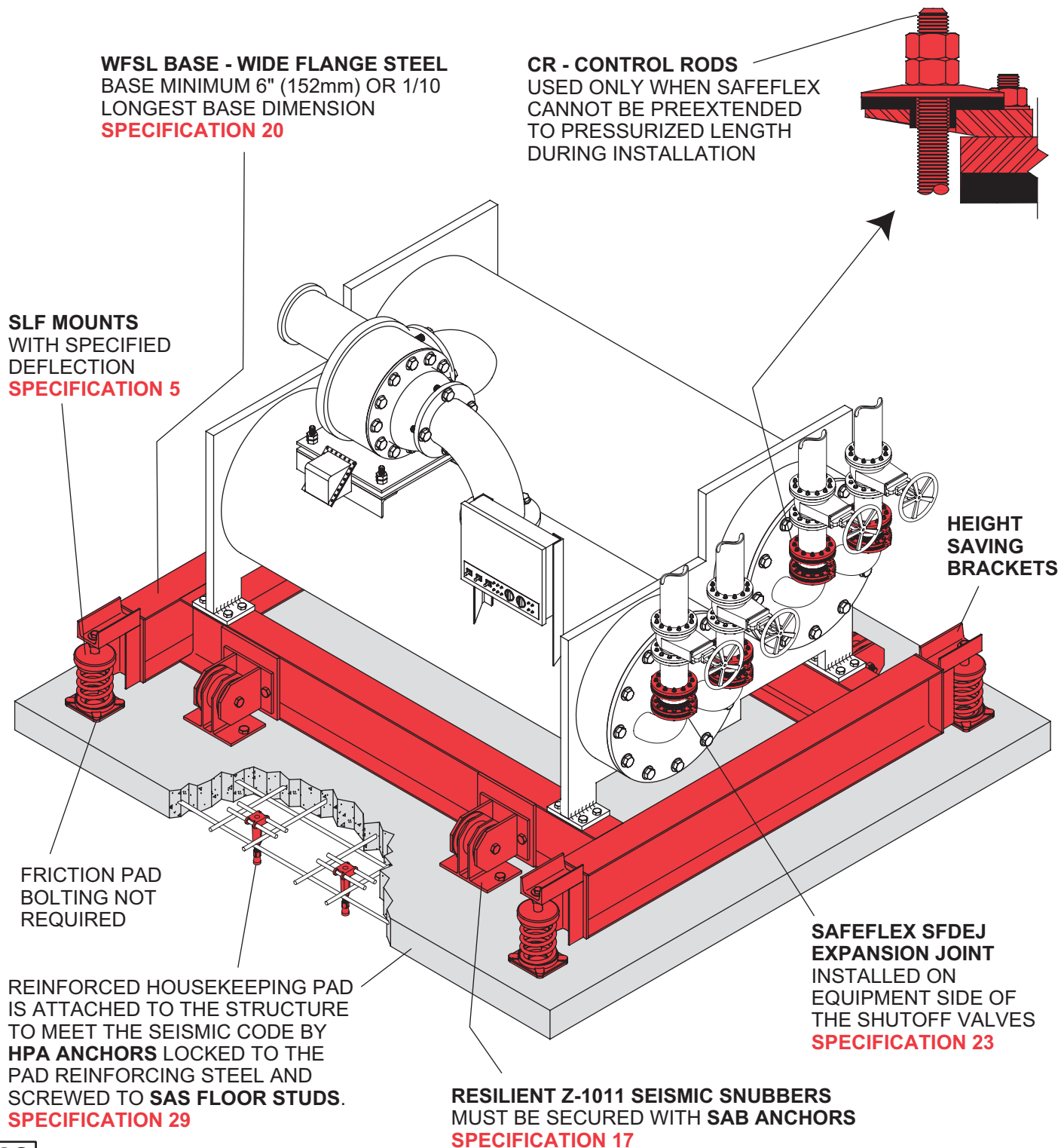
Seismic Applications are basically the same as Non Seismic but complicated by the need to keep equipment in place. Whenever we show our Z-1011 heavily cushioned snubbers, the input to the equipment will not exceed 4 G. All mountings, hanger-cables or snubbers are designed to resist the seismic force in any zone or specification. Many of the mountings

and hangers are the same as in static locations but designated by numbers in the Selection Guide rather than letters to distinguish the two applications. We hope these illustrations will help.

Page	Equipment	Isolation Description
2S	Centrifugal Chiller	Steel Base with Height Saving Brackets, High Deflection Springs and Seismic Restraints
3S	Centrifugal Chiller	Seismically Rated Twin Sphere Air Spring Mounts
4S	Reciprocating Direct Drive Compressor	Height Saving Brackets, High Deflection Springs and Seismic Restraints
5S	Steam Generator	Directly mounted on Restrained Spring Mounts
6S	Double Suction Pump	Concrete Filled Base with Height Saving Brackets, High Deflection Springs and Seismic Restraints
7S	End Suction Pump	Steel Base with Height Saving Brackets, High Deflection Springs and Seismic Restraints
8S	End Suction Pump	Steel Base with Height Saving Brackets, Air Springs and Seismic Restraints
9S	HVAC Unit	Suspended from Hangers and restrained by Cable Assemblies in four corners
10S	HVAC Unit	Steel Base with Height Saving Brackets, High Deflection Springs and Seismic Restraints
11S	HVAC Unit	Directly mounted on 1" Deflection Springs
12S	Vertical Tank Type Compressor	Concrete Filled Base, 1" Deflection Springs and Seismic Restraints
13S	Horizontal Tank Type Compressor	Directly mounted on Restrained Spring Mounts
14S	Direct Drive Blower	Bolted to Steel Base supported by Restrained Spring Mounts
15S	Utility Blower	Directly mounted on Seismically Restrained Mounts
16S	Centrifugal Blower	Concrete Filled Base with Height Saving Brackets, High Deflection Springs and Seismic Snubbers
17S	Centrifugal Blower	Concrete Filled Base with 1" Deflection Springs, Built In Corners and Seismic Snubbers
18S	Axial Blower	Steel Base with Height Saving Brackets, High Deflection Springs and Thrust Restraints.
19S	Axial Blower	Suspended by Hangers, restrained by Cable Assemblies and Thrust Restraints
20S	Large Multi-sectioned Cooling Tower	Steel Base and Beam Supports using Restrained Air Spring Mounts
21S	Large Multi-sectioned Cooling Tower	Steel Base and Beam Supports using High Deflection Steel Spring Restrained Mounts
22S	Packaged HVAC Cooling Tower	Steel Base with Restrained Twin Sphere Air Spring Mounts
23S	Rooftop Packaged HVAC Cooling Tower	Steel Base and Restrained Spring Mounts
24S	Large Transformer	Steel Base supported by Air Spring Mounts and Seismic Restraints

NOTE: All floor mounted systems are on seismically attached Housekeeping Pads.
 All pipelines include Safeflex expansion joints to allow seismic movement.

CENTRIFUGAL CHILLER on **WFSL** Base with height saving brackets and high deflection **SLF** Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



CENTRIFUGAL CHILLER directly mounted on seismically rated **SLR-MT** Restrained Twin Sphere Air Spring Mounts. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.

SLR-MT RESTRAINED TWIN SPHERE AIR SPRING MOUNT WITH SPECIFIED FREQUENCY. MUST BE SECURED WITH SAB ANCHORS SPECIFICATION 9

CR - CONTROL RODS
USED ONLY WHEN SAFEFLEX CANNOT BE PREEXTENDED TO PRESSURIZED LENGTH DURING INSTALLATION

CORNER VALVE
EACH SIDE
CONTROLS CORNER
AIR SPRINGS

REINFORCED HOUSEKEEPING PAD IS ATTACHED TO THE STRUCTURE TO MEET THE SEISMIC CODE BY **HPA ANCHORS** LOCKED TO THE PAD REINFORCING STEEL AND SCREWED TO **SAS FLOOR STUDS. SPECIFICATION 29**

3 AIR SPRING
LEVELING VALVES
(PIPING NOT SHOWN)

CONTROLS 2 END
AIR SPRINGS

SAFEFLEX SFDEJ EXPANSION JOINT
INSTALLED ON EQUIPMENT SIDE OF
THE SHUTOFF VALVES
SPECIFICATION 23

RECIPROCATING DIRECT DRIVE COMPRESSOR with height saving brackets on high deflection **SLF** Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors.

SLF SPRING MOUNTS
WITH SPECIFIED DEFLECTION
SPECIFICATION 5

**HEIGHT SAVING
BRACKET**

FRICTION PAD
BOLTING NOT
REQUIRED

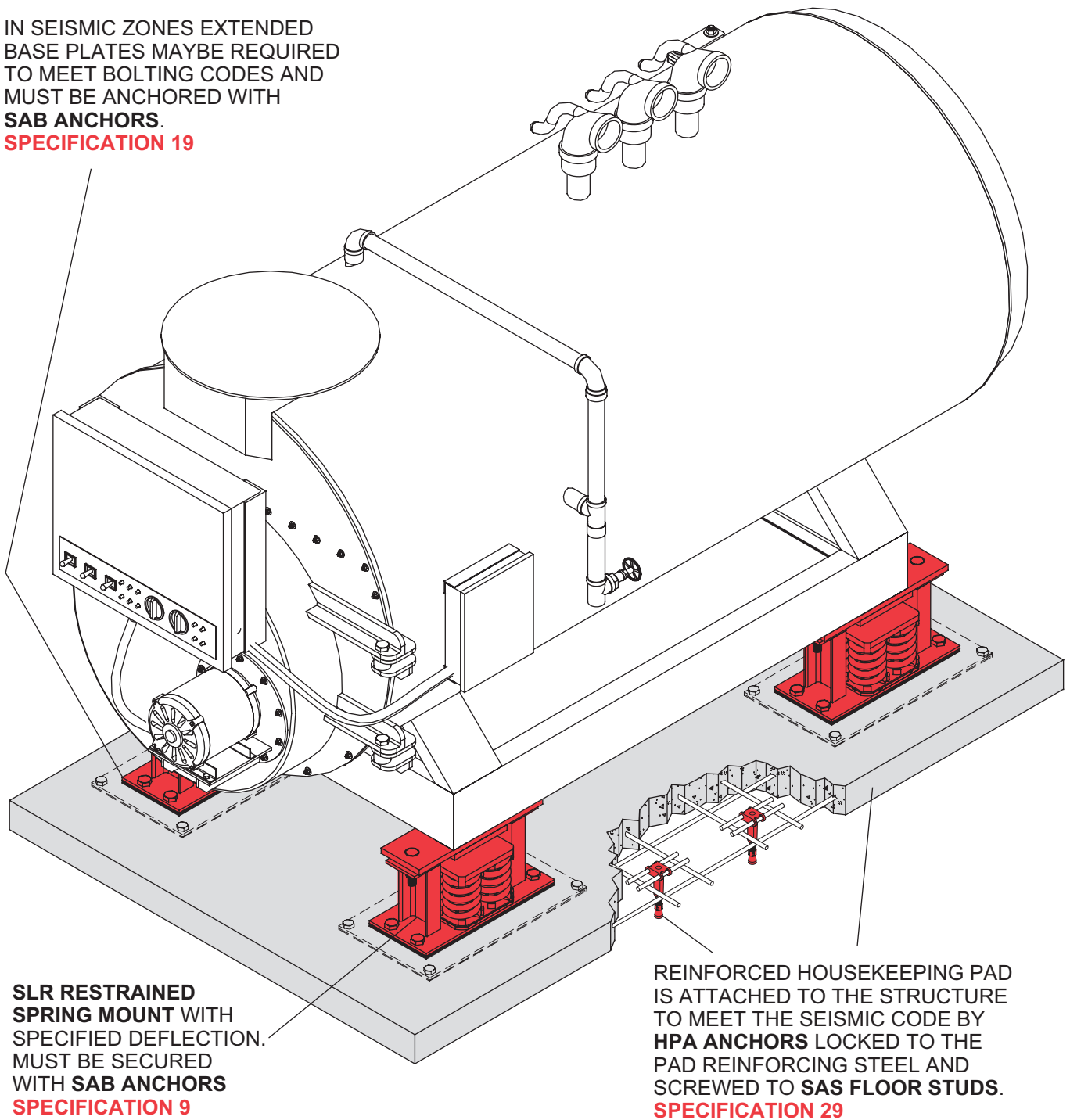
COMPRESSOR MANUFACTURERS
BASE MUST HAVE SUFFICIENT
INTEGRITY TO ACCEPT MOUNTING
AND SNUBBER LOADING

REINFORCED HOUSEKEEPING PAD
IS ATTACHED TO THE STRUCTURE
TO MEET THE SEISMIC CODE BY
HPA ANCHORS LOCKED TO THE
PAD REINFORCING STEEL AND
SCREWED TO **SAS FLOOR STUDS**.
SPECIFICATION 29

**RESILIENT Z-1011
SEISMIC SNUBBERS**
MUST BE SECURED
WITH **SAB ANCHORS**
SPECIFICATION 17

STEAM GENERATOR directly mounted on **SLR** Restrained Spring Mounts. Reinforced housekeeping pad secured by **HPA** Anchors.

IN SEISMIC ZONES EXTENDED
BASE PLATES MAYBE REQUIRED
TO MEET BOLTING CODES AND
MUST BE ANCHORED WITH
SAB ANCHORS.
SPECIFICATION 19



DOUBLE SUCTION PUMP on concrete filled **BMK** Base with height saving brackets, high deflection **SLF** Spring Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.

CR - CONTROL RODS

USED ONLY WHEN SAFEX CANNOT BE PREEXTENDED TO PRESSURIZED LENGTH DURING INSTALLATION

SAFEX SFDEJ EXPANSION JOINT INSTALLED ON EQUIPMENT SIDE OF THE SHUTOFF VALVES
SPECIFICATION 23

FILL PUMP BASE WITH GROUT IF CALLED FOR BY PUMP MANUFACTURER

RESILIENT Z-1011 SEISMIC SNUBBERS MUST BE SECURED WITH **SAB ANCHORS**
SPECIFICATION 17

HEIGHT SAVING BRACKETS

FRICTION PAD BOLTING NOT REQUIRED

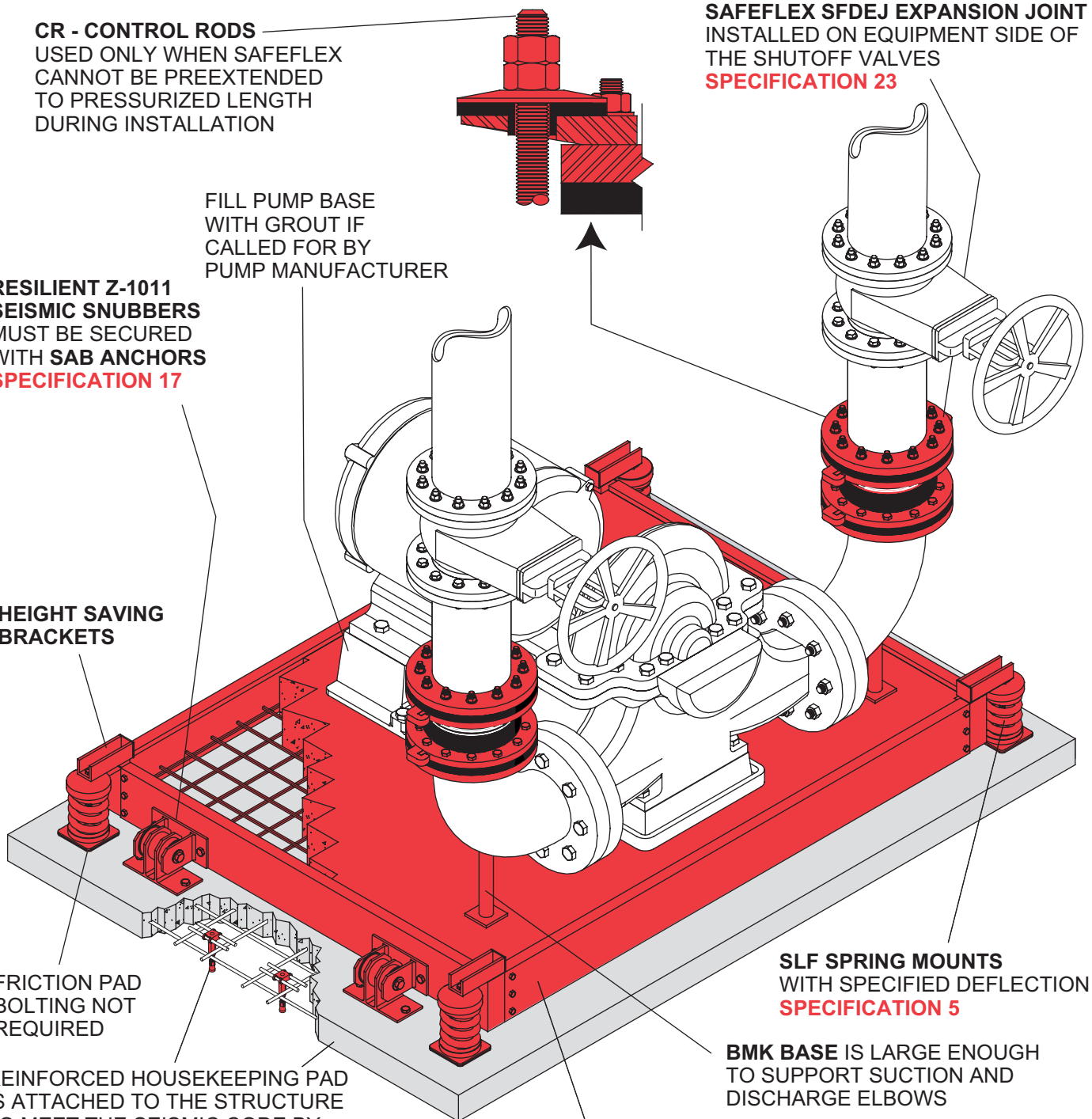
REINFORCED HOUSEKEEPING PAD IS ATTACHED TO THE STRUCTURE TO MEET THE SEISMIC CODE BY **HPA ANCHORS** LOCKED TO THE PAD REINFORCING STEEL AND SCREWED TO **SAS FLOOR STUDS**.

6S SPECIFICATION 29

SLF SPRING MOUNTS WITH SPECIFIED DEFLECTION
SPECIFICATION 5

BMK BASE IS LARGE ENOUGH TO SUPPORT SUCTION AND DISCHARGE ELBOWS

BMK FLOATING CONCRETE BASE MINIMUM 6" (150mm) OR 1/12 LONGEST BASE DIMENSION
SPECIFICATION 21



END SUCTION PUMP on **WFSL** Base with height saving brackets, high deflection **SLF** Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.

CR - CONTROL RODS
USED ONLY WHEN **SAFEFLEX**
CANNOT BE PREEXTENDED
TO PRESSURIZED LENGTH
DURING INSTALLATION

WFSL BASE - WIDE FLANGE STEEL
BASE MINIMUM 6" (152mm) OR 1/10
LONGEST BASE DIMENSION
SPECIFICATION 20

**HEIGHT
SAVING
BRACKETS**

**SAFEFLEX SFDEJ
EXPANSION JOINT**
INSTALLED ON
EQUIPMENT SIDE
OF THE SHUTOFF
VALVES
SPECIFICATION 23

**FRICTION PAD
BOLTING NOT
REQUIRED**

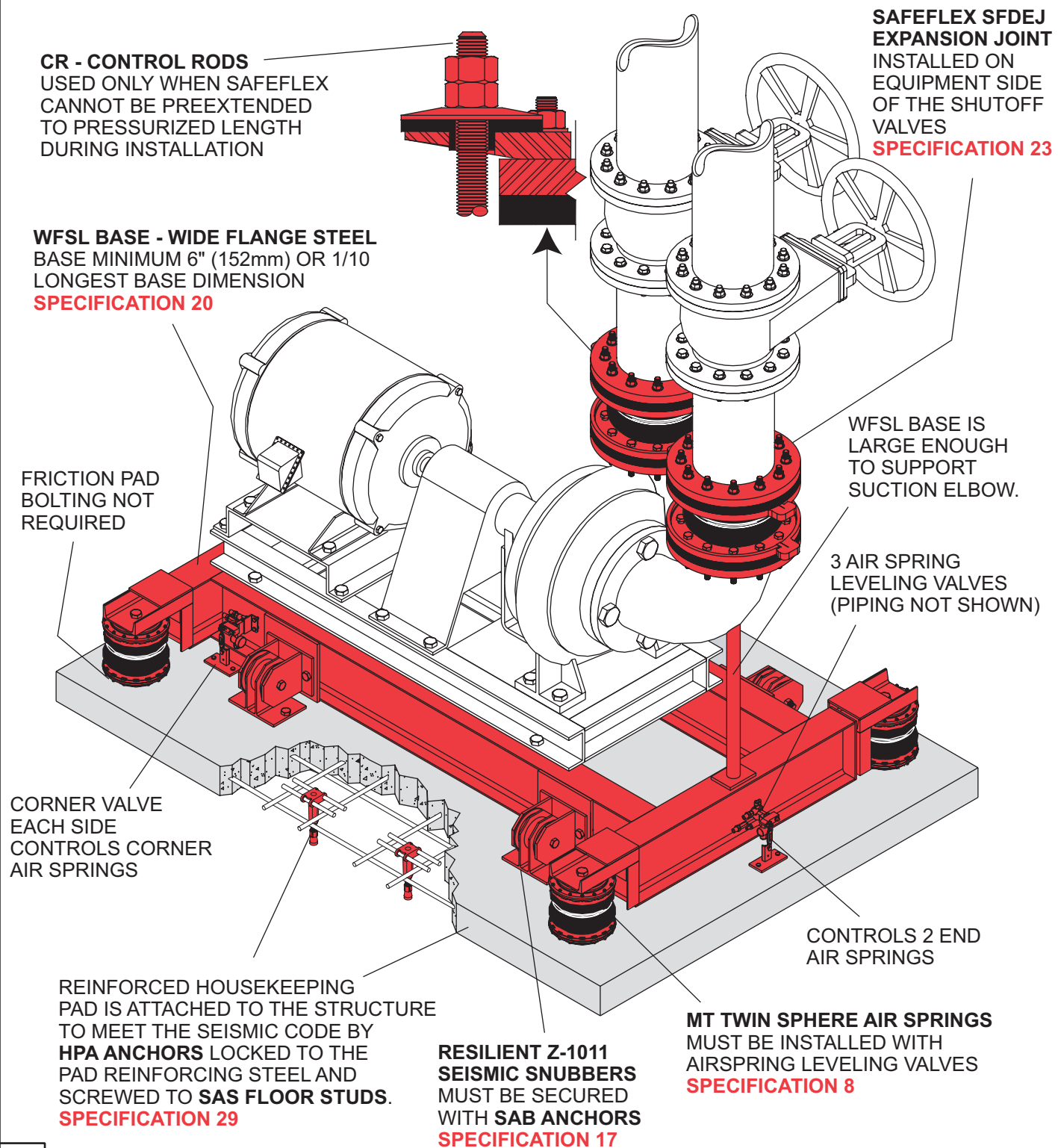
**RESILIENT Z-1011
SEISMIC SNUBBERS**
MUST BE SECURED
WITH **SAB** ANCHORS
SPECIFICATION 17

REINFORCED HOUSEKEEPING PAD IS
ATTACHED TO THE STRUCTURE TO MEET
THE SEISMIC CODE BY **HPA** ANCHORS LOCKED
TO THE PAD REINFORCING STEEL AND
SCREWED TO **SAS** FLOOR STUDS.
SPECIFICATION 29

SLF SPRING MOUNTS
WITH SPECIFIED DEFLECTION
SPECIFICATION 5

**WFSL BASE IS
LARGE ENOUGH
TO SUPPORT
SUCTION ELBOW**

END SUCTION PUMP on **WFSL** Base with height saving brackets, **MT** Air Springs and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



HVAC UNIT suspended from **RW30N** Hangers and restrained by **SCB** Cable Assemblies in four corners. **SAFEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.

SCB - SEISMIC CABLE BRACING
BOTH SIDES (ONE SIDE SHOWN)
SPECIFICATION 12

RESTRAINT ANGLE
30° TO 60° TO STRUCTURE.
ANGLE OF ATTACHMENT 45°

**SRC - SEISMIC
ROD CLAMP AND
ANGLE BRACES FOR
THREADED RODS**
SPECIFICATION 14

**SCBH - SEISMIC
CABLE BRACING HOOK**
SPECIFICATION 12

RW30N SPRING HANGERS
WITH SPECIFIED DEFLECTION
SPECIFICATION 10

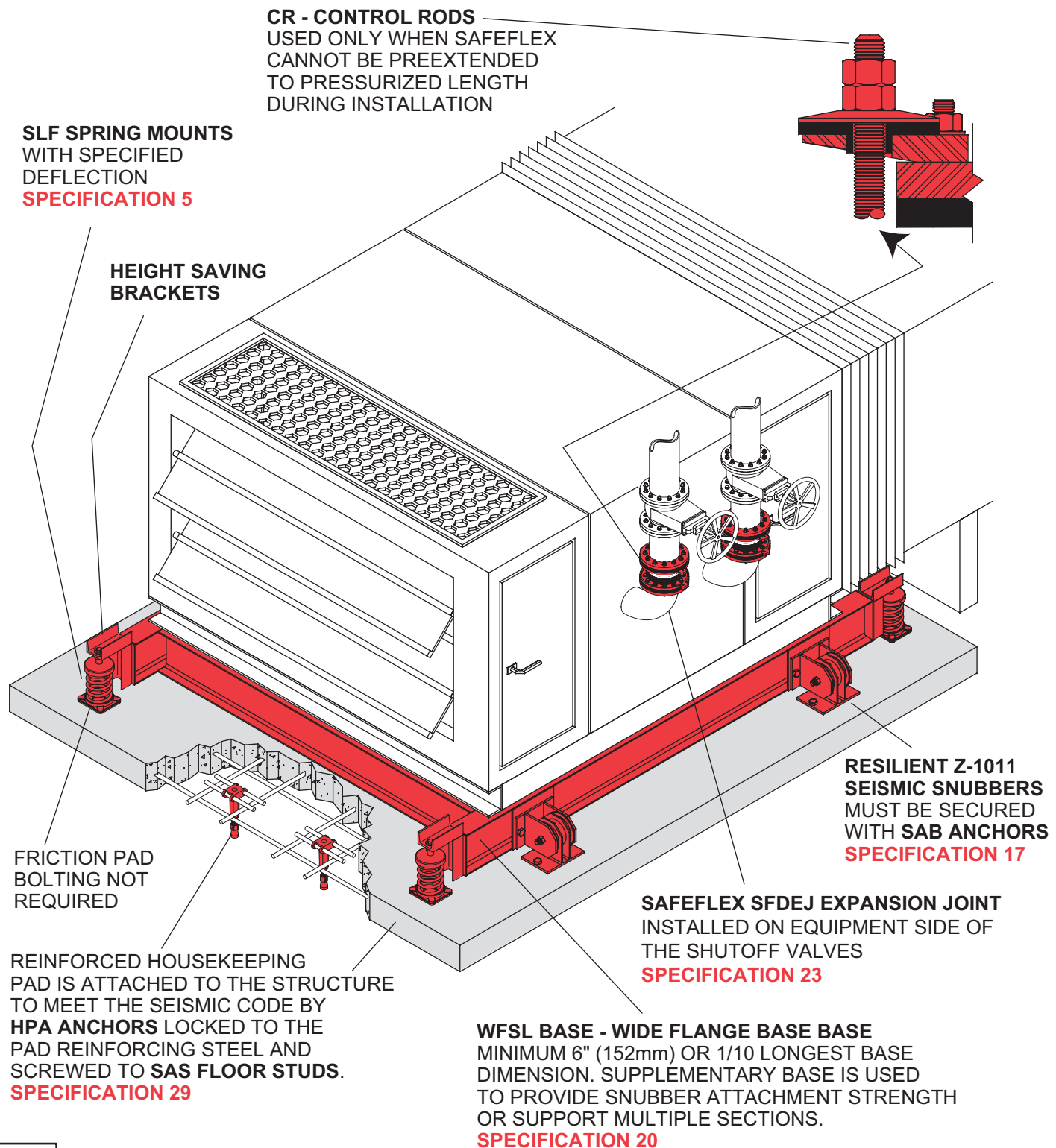
SAFEX SFDEJ EXPANSION JOINT
INSTALLED ON EQUIPMENT SIDE OF
THE SHUTOFF VALVES
SPECIFICATION 23

DOUBLE DEFLECTION
NEOPRENE ELEMENT
WITH PROJECTING
BUSHING TO PREVENT
STEEL TO STEEL CONTACT.
NEOPRENE SPRING CUP
WITH A PROJECTING
BUSHING TO PREVENT
STEEL TO STEEL CONTACT.
REBOUND WASHER
TO PREVENT UP LIFT.
ROD CAN SWING 30°
BEFORE CONTACTING
RESILIENT BUSHING.

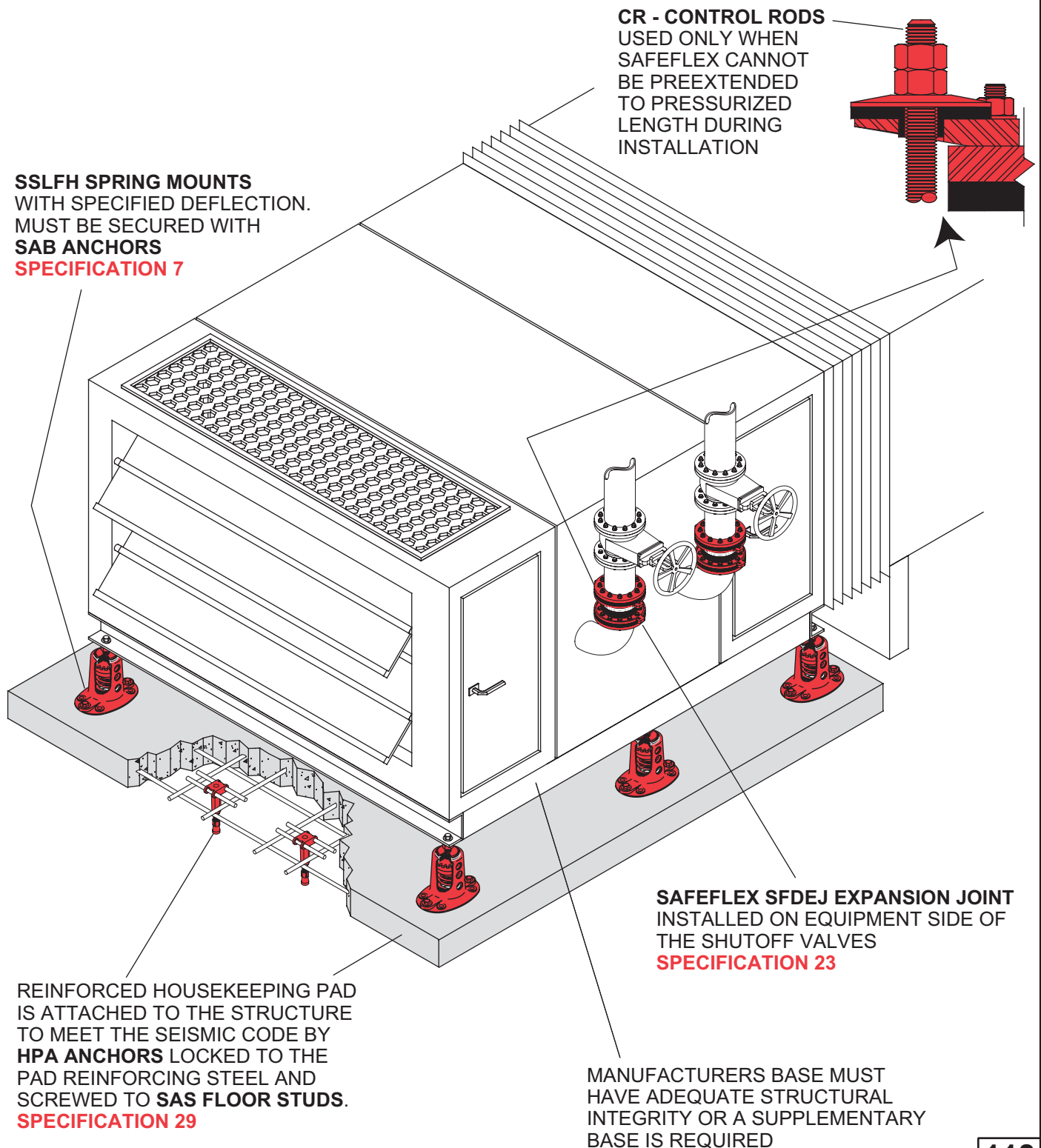
SWAY BRACING
NOT SHOWN
THIS SIDE

CR - CONTROL RODS
USED ONLY WHEN SAFEX
CANNOT BE PREEXTENDED
TO PRESSURIZED LENGTH
DURING INSTALLATION

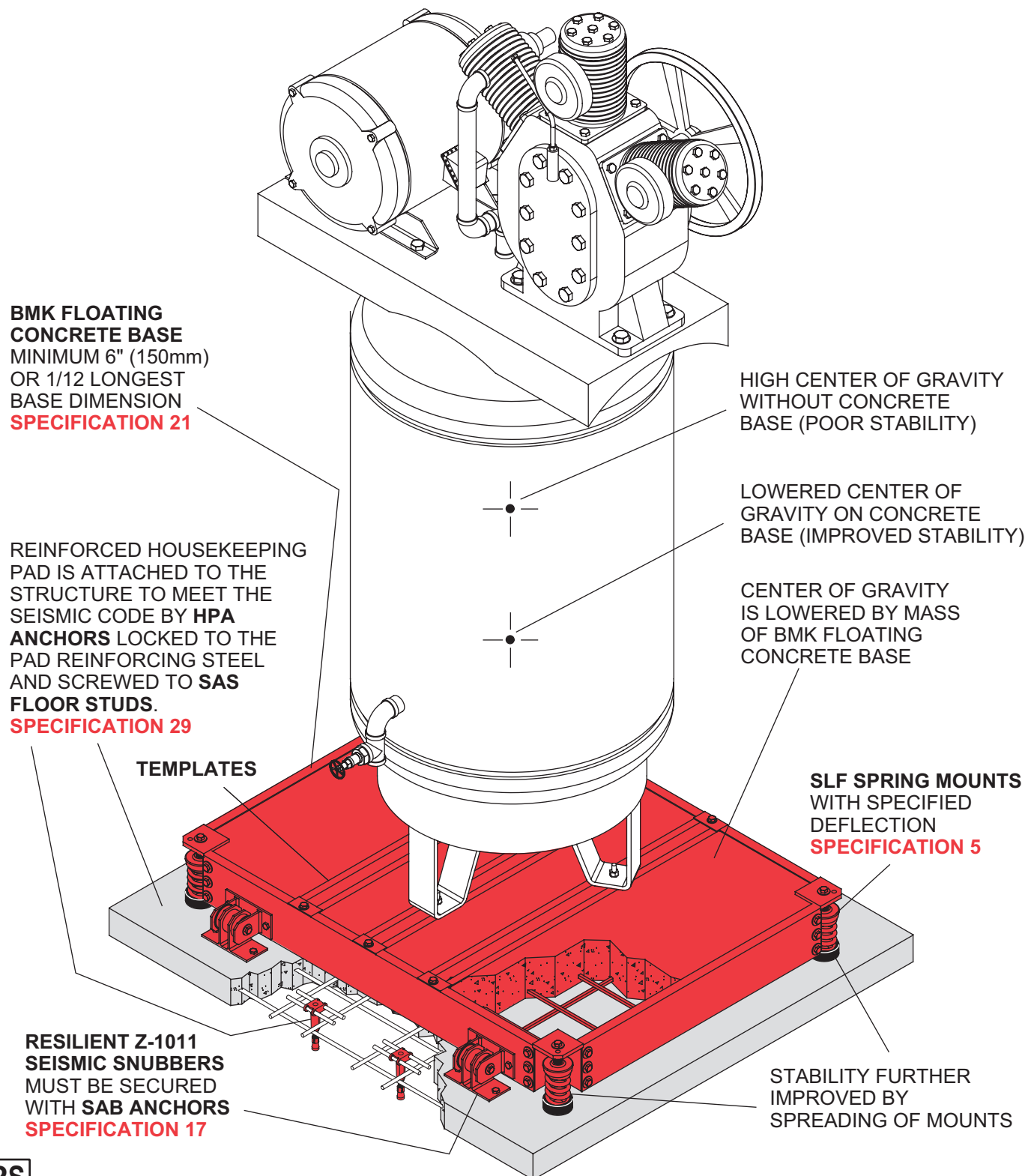
HVAC UNIT on steel base with height saving brackets, high deflection **SLF Spring Mounts** and **Z-1011 Seismic Restraints**. Reinforced housekeeping pad secured by **HPA Anchors**. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



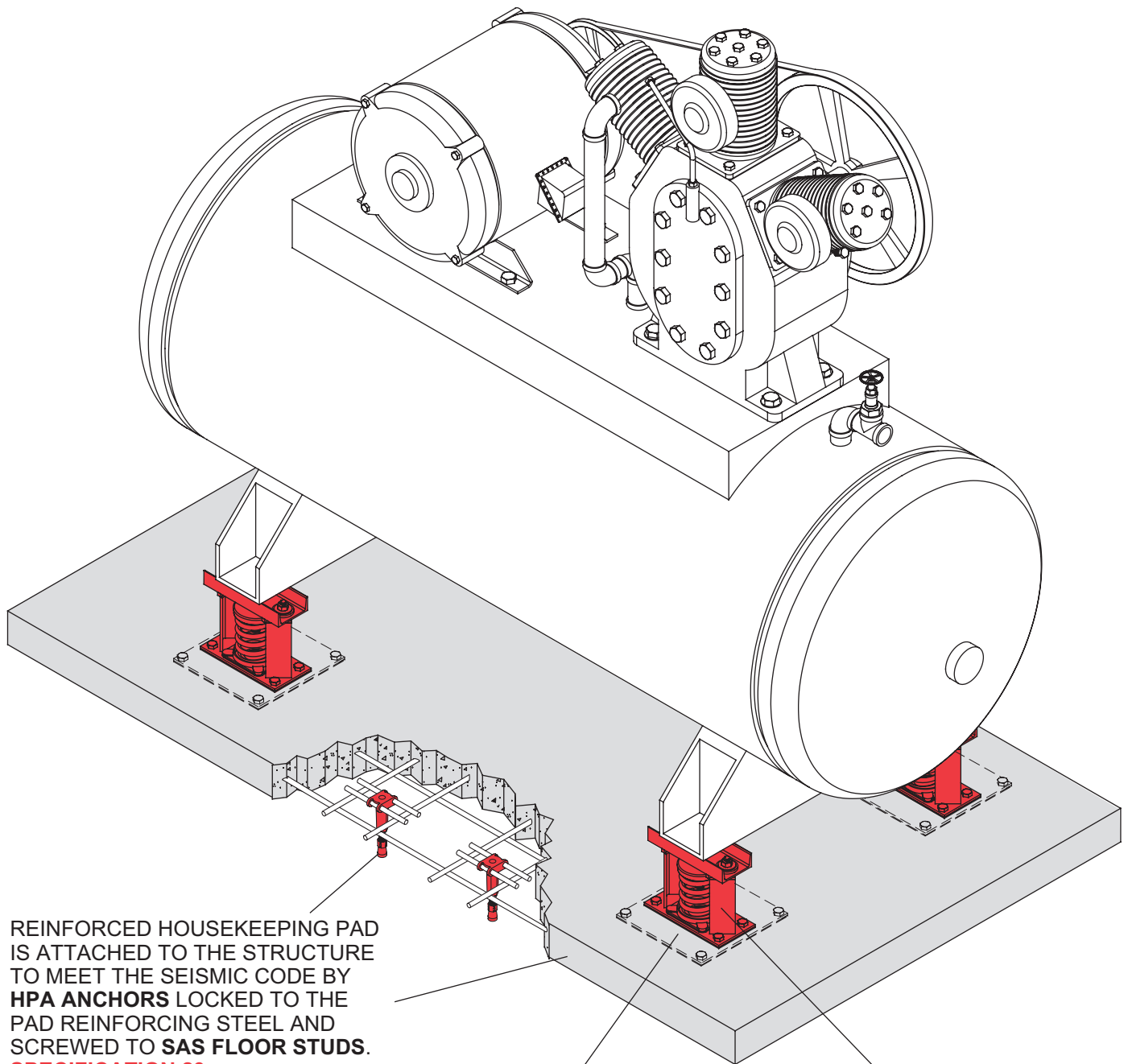
HVAC UNIT directly mounted on 1" deflection **SSLFH** Spring Mounts. Reinforced housekeeping pad secured by **HPA** Anchors. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



VERTICAL TANK TYPE COMPRESSOR directly mounted on **BMK** Concrete Filled Base, 1" deflection **SLF** Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors.



HORIZONTAL TANK TYPE COMPRESSOR
directly mounted on **SLR Restrained Spring Mounts**.
Reinforced housekeeping pad secured by **HPA Anchors**.



REINFORCED HOUSEKEEPING PAD
IS ATTACHED TO THE STRUCTURE
TO MEET THE SEISMIC CODE BY
HPA ANCHORS LOCKED TO THE
PAD REINFORCING STEEL AND
SCREWED TO **SAS FLOOR STUDS**.
SPECIFICATION 29

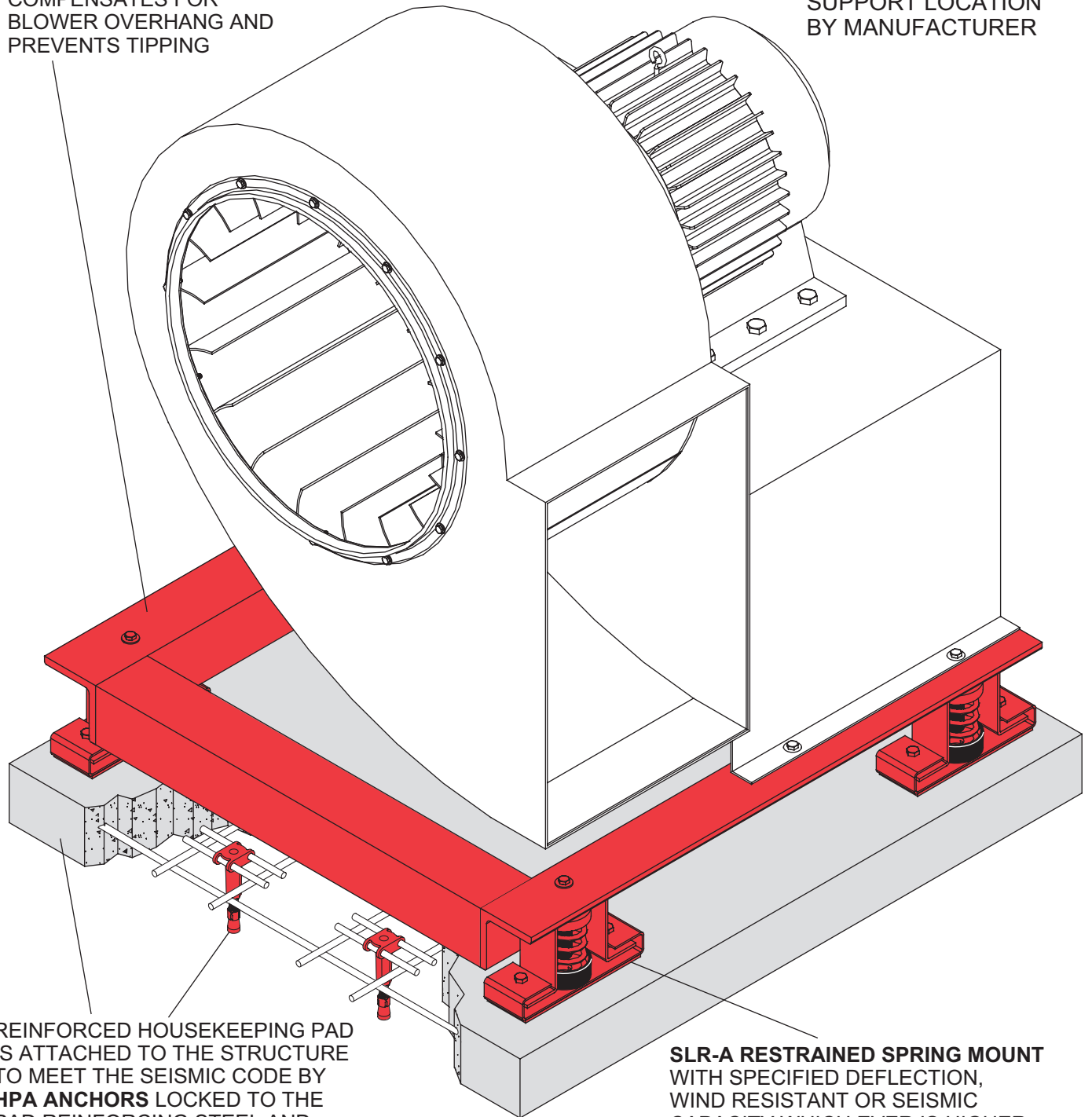
IN SEISMIC ZONES EXTENDED
BASE PLATES MAYBE REQUIRED
TO MEET BOLTING CODES AND
MUST BE ANCHORED WITH
SAB ANCHORS.
SPECIFICATION 19

SLR RESTRAINED SPRING MOUNT
WITH SPECIFIED FREQUENCY.
MUST BE SECURED WITH
SAB ANCHORS
SPECIFICATION 9

DIRECT DRIVE BLOWER bolted to **MS-SLR** Steel Angle Base
supported by **SLR-A** Restrained Spring Mounts.
Reinforced housekeeping pad secured by **HPA** Anchors.

MS-SLR - STEEL ANGLE BASE
COMPENSATES FOR
BLOWER OVERHANG AND
PREVENTS TIPPING

**NOTE: NO OUTBOARD
SUPPORT LOCATION
BY MANUFACTURER**



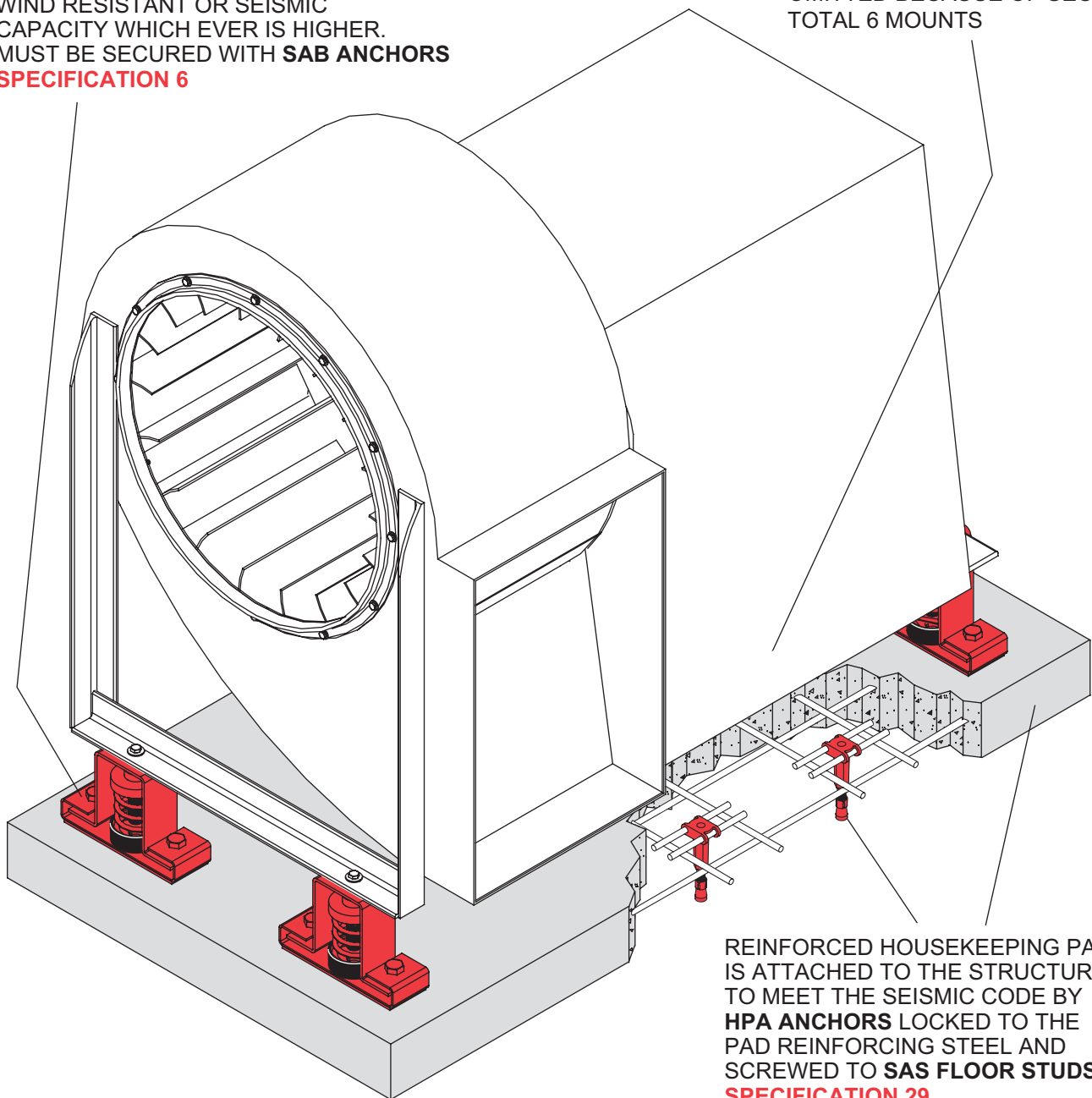
REINFORCED HOUSEKEEPING PAD
IS ATTACHED TO THE STRUCTURE
TO MEET THE SEISMIC CODE BY
HPA ANCHORS LOCKED TO THE
PAD REINFORCING STEEL AND
SCREWED TO **SAS FLOOR STUDS**.
SPECIFICATION 29

SLR-A RESTRAINED SPRING MOUNT
WITH SPECIFIED DEFLECTION,
WIND RESISTANT OR SEISMIC
CAPACITY WHICH EVER IS HIGHER.
MUST BE SECURED WITH **SAB ANCHORS**
SPECIFICATION 6

UTILITY BLOWER directly mounted on seismically restrained **SLR-A Mounts**. Reinforced housekeeping pad secured by **HPA Anchors**. Also useful for non seismic outdoor windy locations.

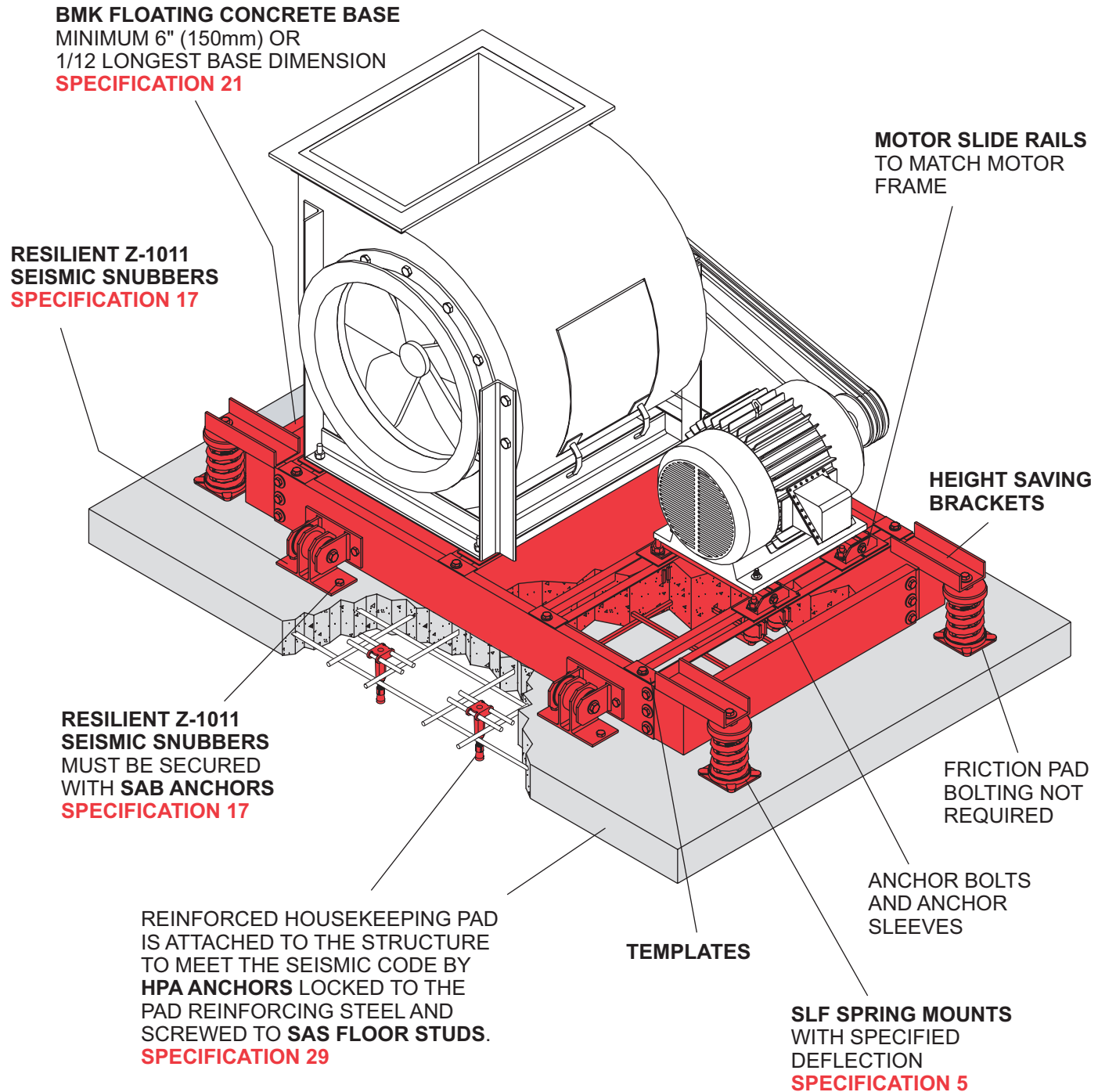
SLR-A SPRING MOUNT
WITH SPECIFIED DEFLECTION,
WIND RESISTANT OR SEISMIC
CAPACITY WHICH EVER IS HIGHER.
MUST BE SECURED WITH **SAB ANCHORS**
SPECIFICATION 6

NOTE: MOUNT LOCATION
OMITTED BECAUSE OF SECTION
TOTAL 6 MOUNTS

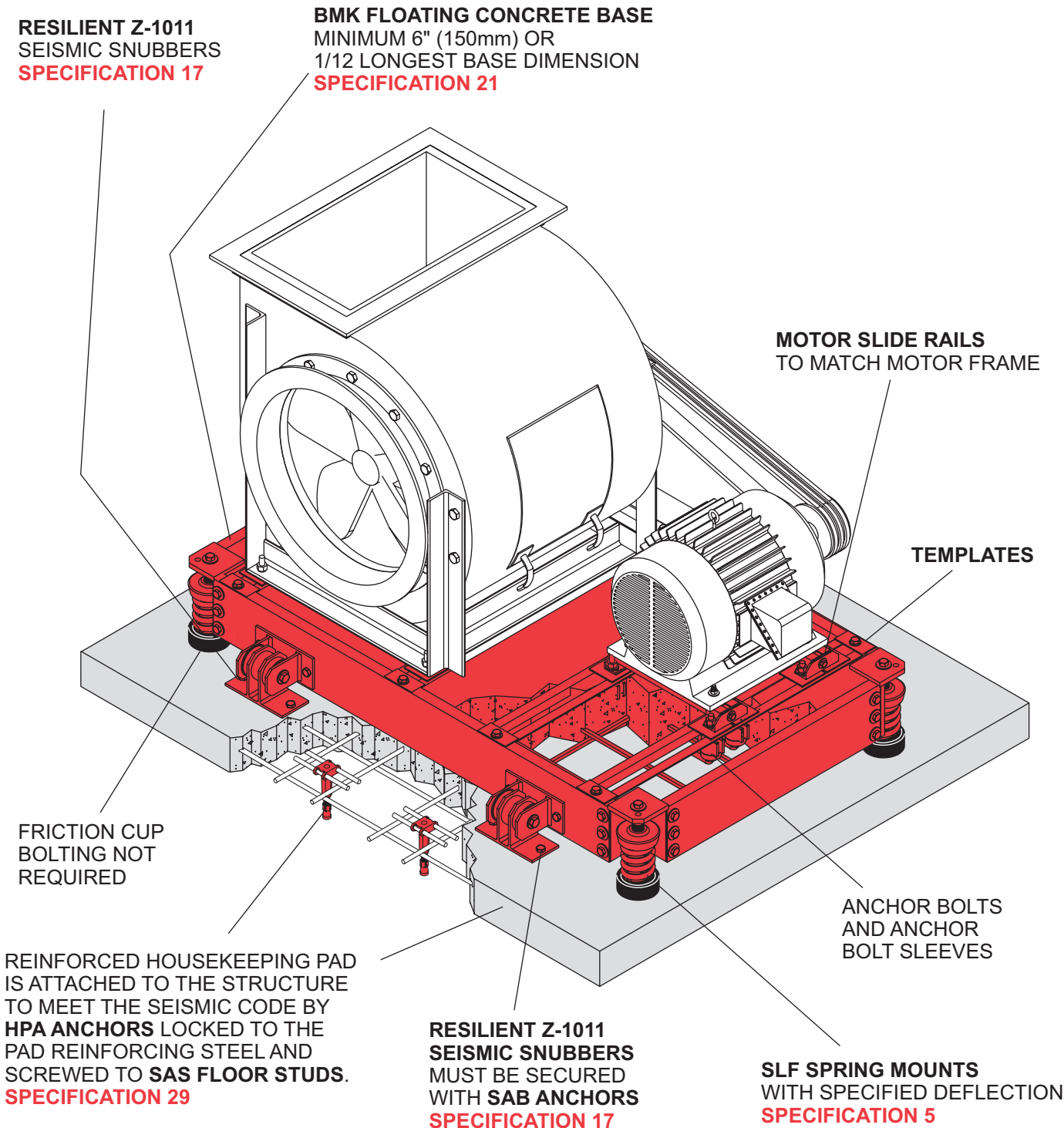


REINFORCED HOUSEKEEPING PAD
IS ATTACHED TO THE STRUCTURE
TO MEET THE SEISMIC CODE BY
HPA ANCHORS LOCKED TO THE
PAD REINFORCING STEEL AND
SCREWED TO **SAS FLOOR STUDS**.
SPECIFICATION 29

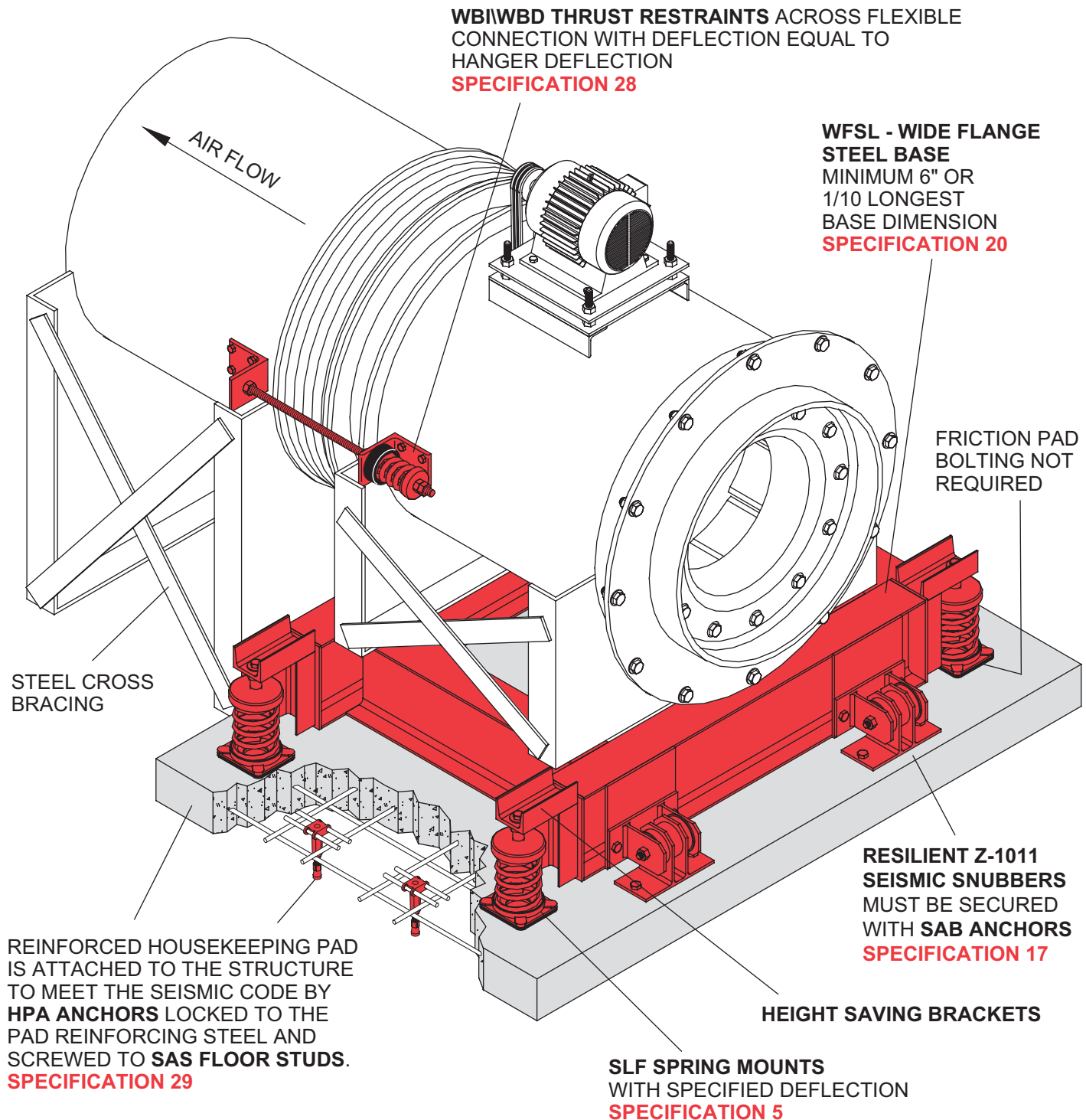
CENTRIFUGAL BLOWER on concrete filled **BMK** Base with height saving brackets, high deflection **SLF** Spring Mounts and **Z-1011** Seismic Snubbers. Reinforced housekeeping pad secured by **HPA** Anchors.



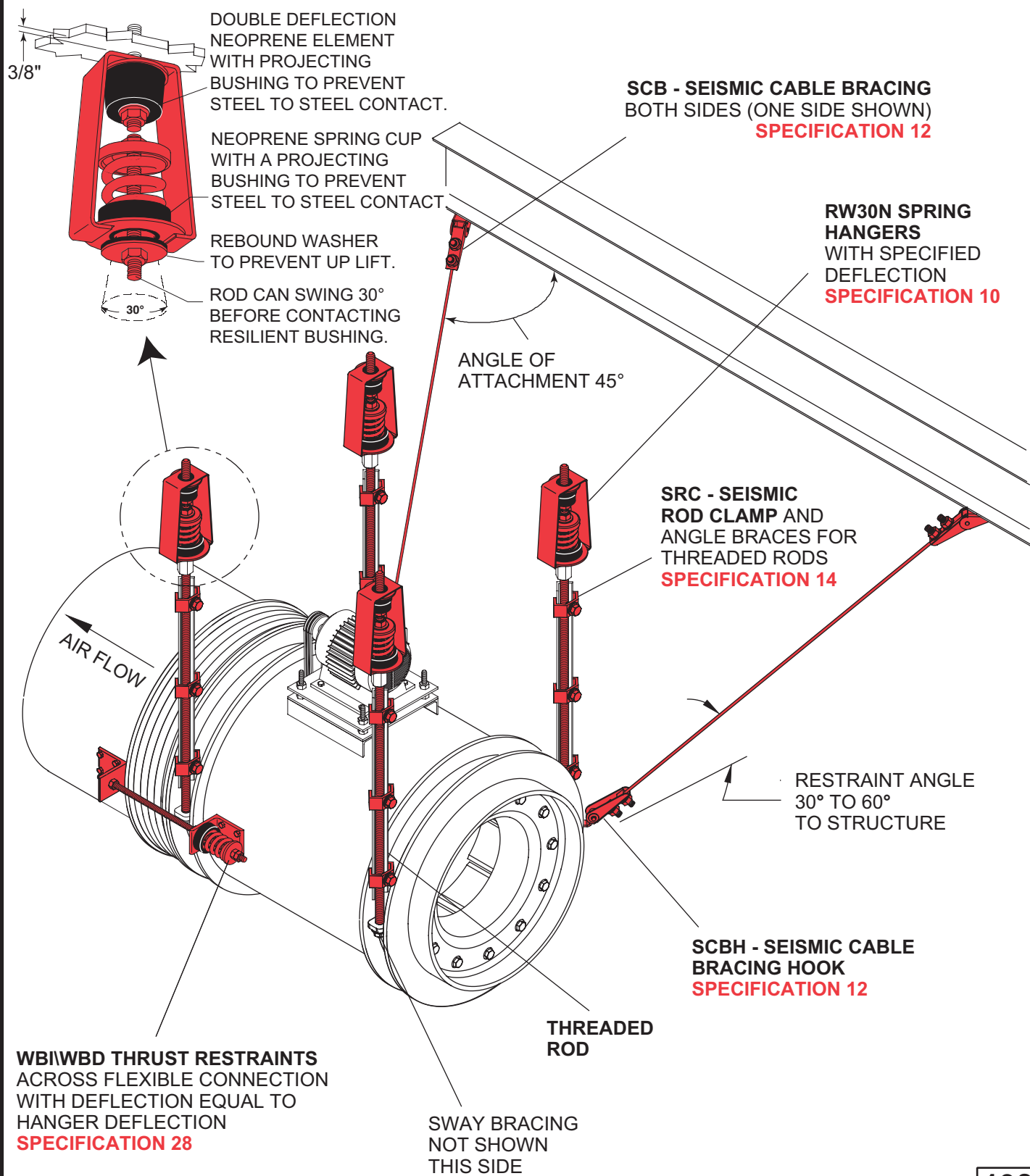
CENTRIFUGAL BLOWER on concrete filled **BMK** Base with built in corners, 1" deflection **SLF** Spring Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors.



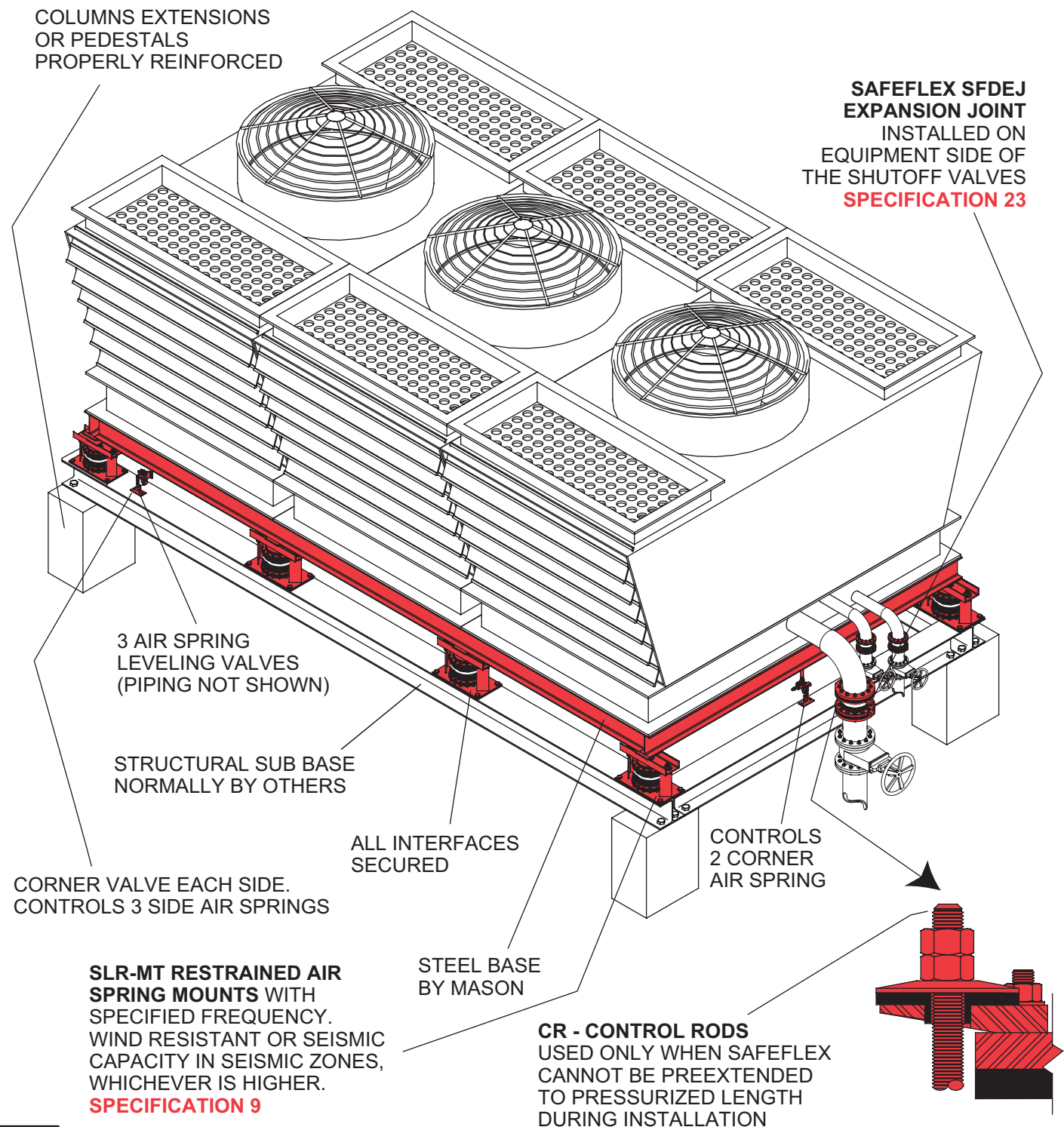
AXIAL BLOWER with **WBI/WBD** Thrust Restraints mounted on **WFSL** Base with height saving brackets, high deflection **SLF** Mounts and **Z-1011** Seismic Restraints. Reinforced housekeeping pad secured by **HPA** Anchors.



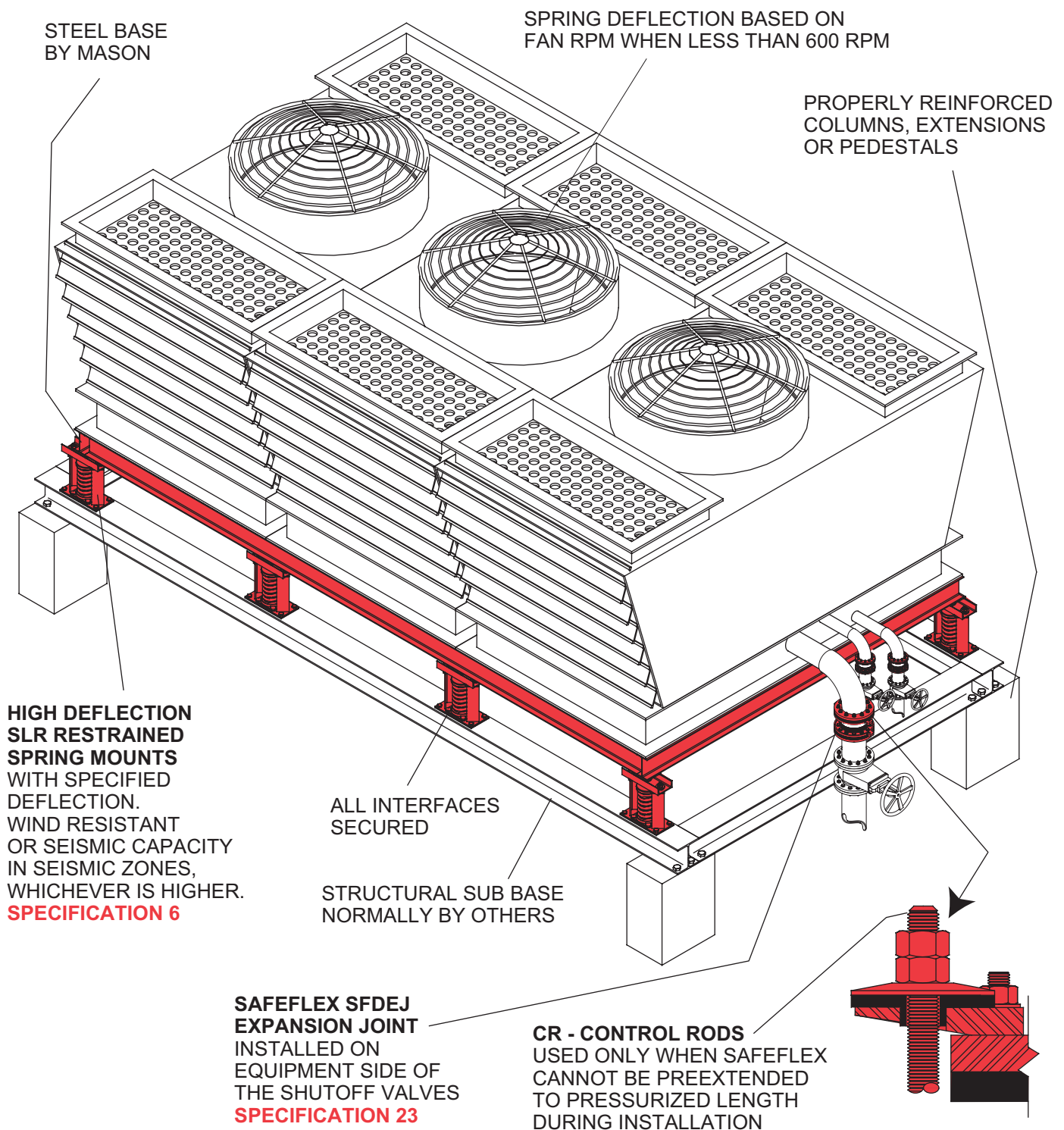
AXIAL BLOWER with WBI/WBD Thrust Restraints suspended by RW30N Hangers and restrained by SCB Cable Assemblies



LARGE MULTI-SECTIONED COOLING TOWER secured to steel base and beam supports using **SLR-MT Restrained Air Spring Mounts**. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



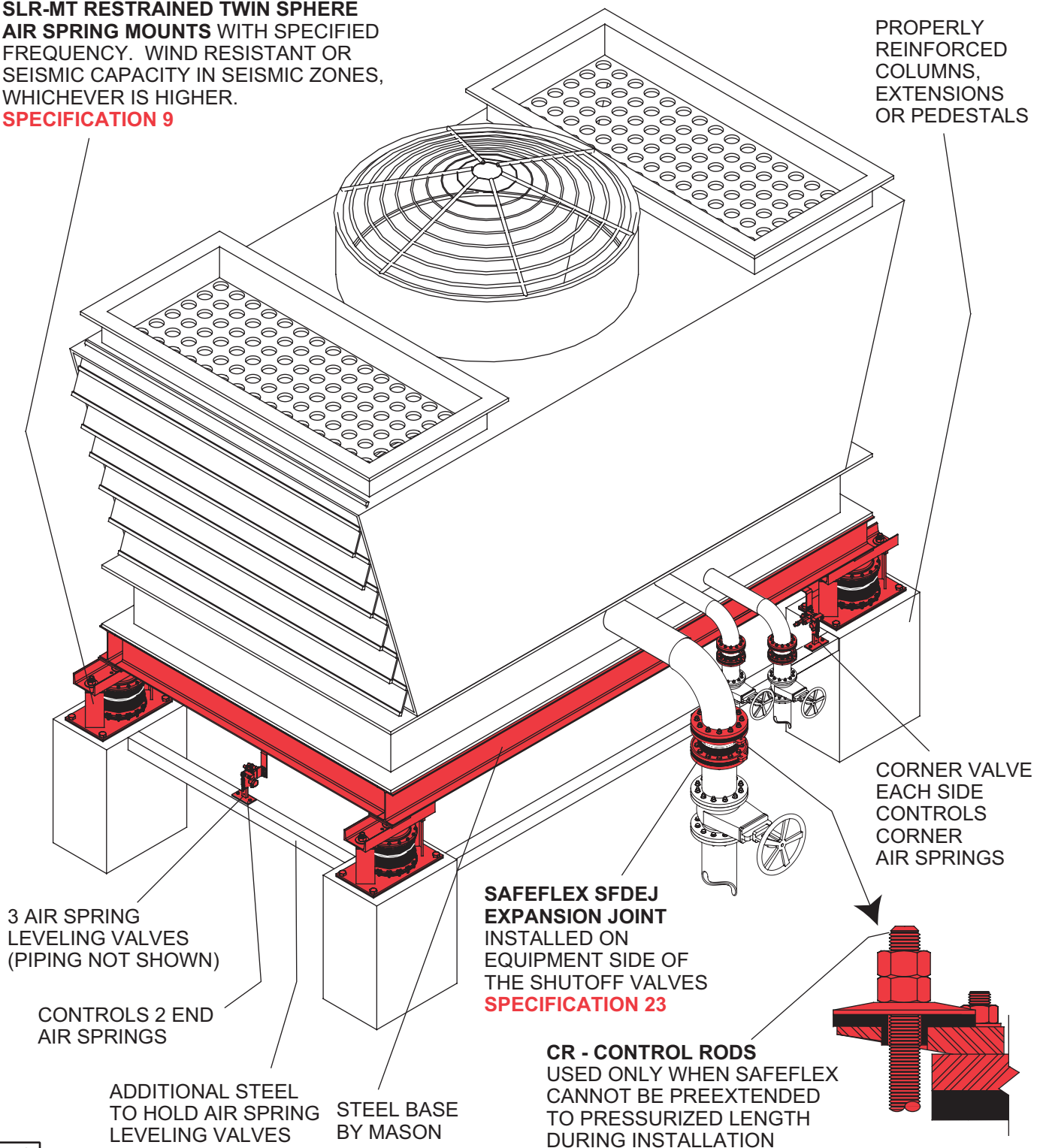
LARGE MULTI-SECTIONED COOLING TOWER secured to steel base and beam supports using high deflection **SLR** Restrained Spring Mounts. **SAFEFLEX** Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.



PACKAGED HVAC COOLING TOWER on steel base with
SLR-MT Restrained Twin Sphere Air Spring Mounts.
SAFEFLEX Expansion Joints are installed in pipelines to reduce blade
frequency vibration and noise and to allow for seismic displacement.

SLR-MT RESTRAINED TWIN SPHERE
 AIR SPRING MOUNTS WITH SPECIFIED
 FREQUENCY. WIND RESISTANT OR
 SEISMIC CAPACITY IN SEISMIC ZONES,
 WHICHEVER IS HIGHER.
SPECIFICATION 9

PROPERLY
 REINFORCED
 COLUMNS,
 EXTENSIONS
 OR PEDESTALS



ROOFTOP PACKAGED HVAC COOLING TOWER

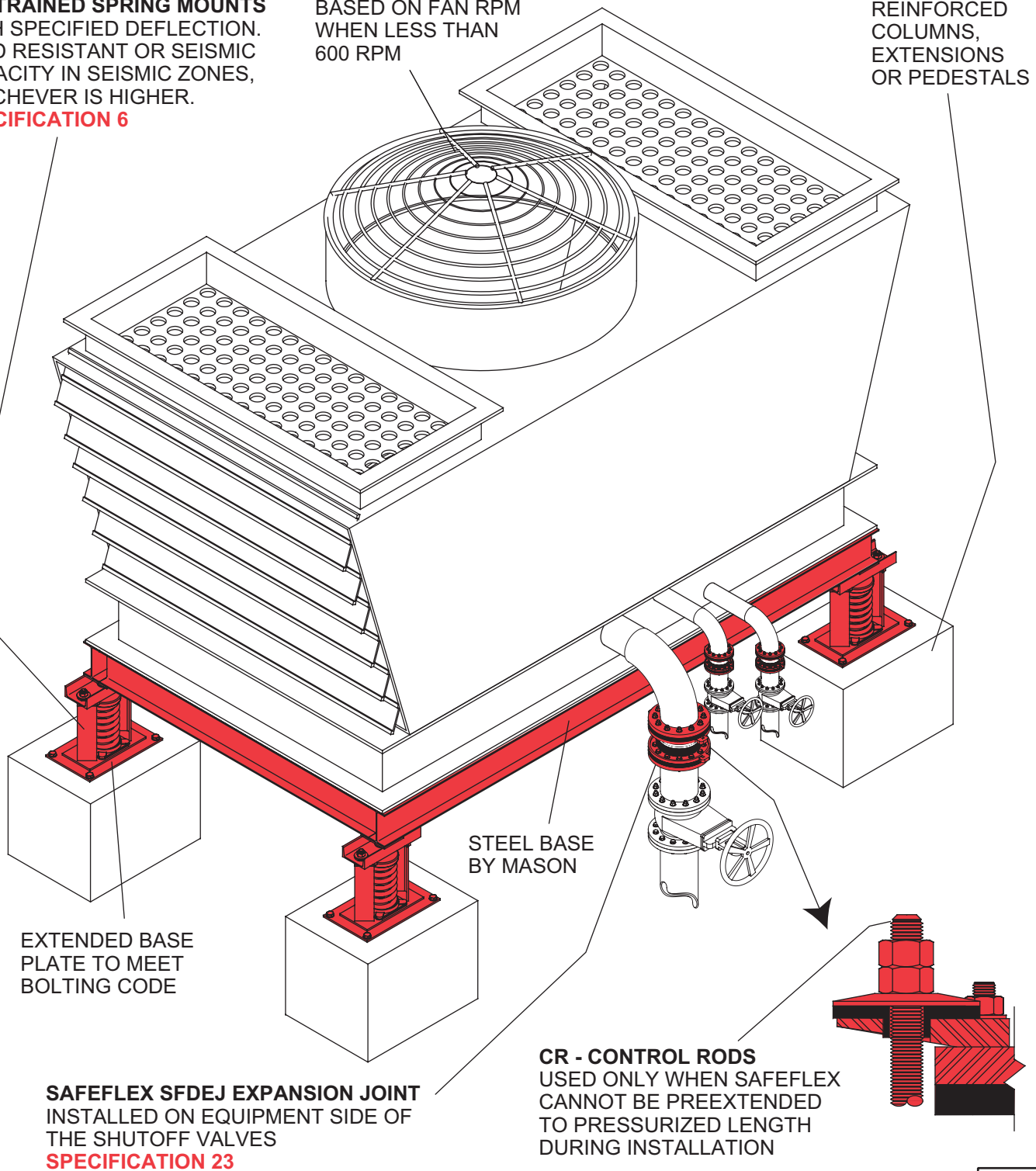
on steel base and **SLR Restrained Spring Mounts**.

SAFEFLEX Expansion Joints are installed in pipelines to reduce blade frequency vibration and noise and to allow for seismic displacement.

HIGH DEFLECTION SLR RESTRAINED SPRING MOUNTS WITH SPECIFIED DEFLECTION. WIND RESISTANT OR SEISMIC CAPACITY IN SEISMIC ZONES, WHICHEVER IS HIGHER.
SPECIFICATION 6

SPRING DEFLECTION
BASED ON FAN RPM
WHEN LESS THAN
600 RPM

PROPERLY
REINFORCED
COLUMNS,
EXTENSIONS
OR PEDESTALS



LARGE TRANSFORMER mounted on a **WFSL** or **KSL** Base supported by **MT Air Spring Mounts** and **Z-1011 Seismic Restraints**. Reinforced housekeeping pad secured by **HPA Anchors**. Schematic Only—Final installation to meet all safety regulations as well as electrical and other codes.

WFSL BASE - WIDE FLANGE STEEL
BASE MINIMUM 6" (152mm) OR 1/10
LONGEST BASE DIMENSION
SPECIFICATION 20

CORNER VALVE
EACH SIDE
CONTROLS
CORNER
AIR SPRINGS

FRICION PAD
BOLTING NOT
REQUIRED

3 AIR SPRING
LEVELING VALVES
(PIPING NOT SHOWN)

CONTROLS 2 END
AIR SPRINGS

**RESILIENT Z-1011
SEISMIC SNUBBERS**
MUST BE SECURED
WITH **SAB ANCHORS**
SPECIFICATION 17

MT TWIN SPHERE AIR SPRINGS
MUST BE INSTALLED WITH AIR
SPRING LEVELING VALVES
SPECIFICATION 8

REINFORCED HOUSEKEEPING PAD
IS ATTACHED TO THE STRUCTURE
TO MEET THE SEISMIC CODE BY
HPA ANCHORS LOCKED TO THE
PAD REINFORCING STEEL AND
SCREWED TO **SAS FLOOR STUDS**.
SPECIFICATION 29

**KSL BASE - STEEL CHANNEL
REINFORCED AND FILLED WITH
CONCRETE**. BASE MINIMUM 6" (152mm)
OR 1/12 LONGEST BASE DIMENSION
SPECIFICATION 21

ALL OTHER CALLOUTS ABOVE APPLY HERE