

**MRG Physical Asset FMEA Template Collection**

<b>Component</b>	<b>Functions</b>	<b>Failures</b>	<b>Effects</b>	<b>Causes</b>
Actuator_Pneumatic	1	8	60	135
Actuator_Pneumatic_Linear	3	10	10	31
Aerator_Mechanical	3	14	14	39
Agitator_Side Entry_Gear Box Drive_Axial Flow Impellor	3	14	14	45
Agitator_Top Entry_Belt Drive_Axial Flow Impellor	4	14	14	41
Agitator_Top Entry_Gear Box Drive_Axial Flow Impellor	4	13	13	42
Agitator_Top Entry_Gear Box Drive_Radial Flow Impellor	4	15	15	47
Air Handler_Direct Fired_Refrigerant Cooled	3	32	32	89
Air Handler_Steam Heated_Chilled Water Cooled	3	25	25	81
Battery_Electric Storage_Lead Acid	3	6	6	12
Blower_Centrifugal_Belt Driven	4	16	16	45
Blower_Centrifugal_Coupled_Motor Driven	4	14	14	42
Blower_Vacuum_Liquid Ring_Belt Driven	4	24	24	68
Blower_Vacuum_Liquid Ring_Direct Drive	4	23	23	68
Blower_Vacuum_Positive Displacement_Direct Drive	4	19	19	62
Boiler_Coal Fired_Pulverized	3	36	36	94
Boiler_Coal Fired_Spreader Stoker_Traveling Grate	3	41	41	123
Boiler_Gas Fired_Fire Tube	3	29	29	79
Boiler_Gas Fired_Water Tube	3	28	28	76
Boiler_Oil Fired_Gas Pilot	3	38	38	105
Brake_Pneumatic_Spring Apply	1	12	12	30
Burner_Coal_Pulverized	2	17	17	42
Burner_Gas_Boiler	2	13	13	32
Burner_Gas_Excess Air	2	16	16	43
Burner_Oil_Boiler	3	28	28	76
Burner_Oil_Excess Air	3	31	31	87
Burner_Oil_Residual	3	29	29	80
Centrifuge_Horizontal Axis_Bowl_Gear Driven Scroll Discharge	5	19	19	50
Centrifuge_Horizontal Axis_Bowl_Motor Driven Scroll Discharge	5	21	21	55
Centrifuge_Vertical Axis_Bowl_Center Fed	4	19	19	47
Centrifuge_Vertical Axis_Disc Stack	4	18	18	47
Charger_Battery_Electric	2	5	5	8
Chiller_Air Cooled_Circulating_Brine	3	22	22	47
Chiller_Water Cooled_Circulating_Brine	3	22	22	50
Chlorinator_Liquid Metering	3	21	21	50

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Clutch_Friction_Pneumatic	1	12	12	29
Compressor_Centrifugal_Mech Recompressor_Motor Driven	4	18	18	56
Compressor_Centrifugal_Motor Driven	5	20	20	53
Compressor_Reciprocating_One Stage_Belt Driven	4	24	24	62
Compressor_Reciprocating_One Stage_Coupled	4	24	24	62
Compressor_Reciprocating_Two Stage_Belt Driven	2	26	26	61
Compressor_Reciprocating_Two Stage_Coupled	4	29	29	71
Compressor_Rotary Screw_Belt Driven	6	24	24	58
Conveyor_Belt_Chain Drive	4	22	22	66
Conveyor_Belt_Coupled	5	22	22	66
Conveyor_Bucket Elevator_Chain Carrier	1	13	13	37
Conveyor_Bucket Elevator_Coupled	3	15	15	42
Conveyor_Drag_Chain Drive	3	17	17	47
Conveyor_Pneumatic	2	16	16	56
Conveyor_Roller_Belt Driven	2	9	9	30
Conveyor_Roller_Chain Driven	2	6	6	21
Conveyor_Screw_Belt Driven	3	19	19	49
Conveyor_Screw_Chain Driven	3	18	18	49
Conveyor_Vibratory_Linear_Belt Driven	3	14	14	33
Cooler_Rotary_Water Cooled	3	27	27	76
Cooling Tower_Cross Draft_Gear Drive	2	18	18	58
Coupling_Gear	1	2	2	6
Coupling_Insert	1	5	5	11
Crusher_Delumper_Dry_Belt Driven	2	12	12	35
Crusher_Delumper_Dry_Chain Driven	2	12	12	37
Crusher_Roll_Toothed Roll_Hydraulic Drive	3	12	12	33
Cyclone_Dry_Dust Collector	2	5	5	8
Cyclone_Hydroclone	2	7	7	16
Damper_Butterfly_Pneumatic Actuator	3	15	15	42
Damper_Butterfly_Pneumatic Operator	3	18	18	50
Damper_Louver_Fire Safe Actuator	4	15	15	40
Damper_Louver_Pneumatic Actuator	3	16	16	43
Damper_Louver_Pneumatic Operator	3	18	18	50
Damper_Slide Gate_Fire Safe Actuator	4	14	14	40
Damper_Slide Gate_Pneumatic Actuator	3	16	16	47

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Component	Functions	Failures	Effects	Causes
Damper_Slide Gate_Pneumatic Operator	3	23	23	73
Door_Roll-up_Gearbox Drive	2	11	11	35
Drive_Belt	1	2	2	4
Drive_Chain	1	3	3	7
Dryer_Air_Membrane	2	8	8	17
Dryer_Cooler_Stacked Deck_Air Heated-Cooled	3	20	20	58
Dryer_Fluidized Bed_Vibratory Pan	3	15	15	44
Dryer_Rotary_Air Drying	3	24	24	65
Dryer_Rotary_Steam Heated	3	31	31	90
Dust Collector_Bag House_Pulse Air	4	33	33	90
Dust Collector_Bag House_Shaker	4	24	24	73
Dust Collector_Bag House_Sweep Arm Cleaning	4	22	22	59
Ejector_Steam	2	5	5	14
Engine_Diesel_Mobile	3	51	51	141
Engine_Diesel_Stationary	4	48	48	128
Expansion Joint_Bellows_Ductwork	2	4	4	12
Expansion Joint_Fabric_Ductwork	2	4	4	11
Fan_Axial_Cooling Tower	2	11	11	33
Fan_Axial_Ventilation	2	8	8	18
Feeder_Belt_Volumetric	3	28	28	81
Feeder_Rotary_Table	3	14	14	35
Feeder_Screw_Loss in Weight	3	20	20	55
Feeder_Screw_Volumetric	3	18	18	49
Feeder_Vibratory	3	15	15	35
Filter_Bag_Simplex_Liquid	3	9	9	22
Filter_Belt_Reciprocating Tray	6	41	41	87
Filter_Cartridge_Air	2	6	6	13
Filter_Cartridge_Multiplex_Liquid	2	9	9	21
Filter_Cartridge_Simplex_Liquid	2	6	6	13
Filter_Drum_Knife Advance Discharge	8	43	43	103
Filter_Drum_Roll Discharge	7	36	36	85
Filter_Membrane_Gas	2	11	11	24
Filter_Membrane_Liquid	2	10	10	25
Filter_Oil_Compressor Inlet	1	2	2	4
Filter_Press	4	23	23	78

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<b>Component</b>	<b>Functions</b>	<b>Failures</b>	<b>Effects</b>	<b>Causes</b>
Filter_Pressure Leaf	4	18	18	60
Filter_Tube_Liquid	2	8	8	20
Fork Lift_Telehandler	8	94	95	287
Fork Lift_Vertical Mast_Electric Powered	6	54	54	159
Fork Lift_Vertical Mast_Propane Powered	7	76	77	226
Furnace_Multiple Hearth_Activated Carbon Regeneration	3	31	31	101
Gearbox_Grease Lubricated	1	3	3	8
Gearbox_Oil Lubricated	2	7	7	18
Gearmotor_AC	3	9	9	23
Generator_AC	2	18	18	46
Generator_AC_Condensing Steam Turbine Drive	6	62	62	163
Generator_AC_Emergency_Diesel Drive	5	62	62	156
Generator_AC_Gas Turbine Drive	4	34	34	85
Generator_DC_AC Motor Drive	1	15	15	42
Heat Exchanger_Plate and Frame	3	9	9	21
Heat Exchanger_Shell and Tube_Gas-Liquid	2	11	11	21
Heat Exchanger_Shell and Tube_Liquid-Liquid	3	11	11	21
Hoist_Manual	1	5	5	21
Hoist_Powered_Electric	1	12	12	42
HVAC_Air Conditioner_Canned Compressor_Electric Heat	1	11	11	30
Lubrication System_Grease_Pneumatic	2	19	19	43
Lubrication System_Oil_Recirculating	3	19	19	62
Mill_Autogenous	3	46	46	137
Mill_Grinding_Pebble	3	45	45	133
Mill_Hammermill_Direct Coupled	3	14	14	39
Mill_Hammermill_Disintegrator	3	13	13	40
Mill_Pin_Belt Drive	3	13	13	40
Mill_Pin_Motor Drive	3	15	15	48
Mixer_Paddle_Continuous_Belt Driven	3	19	19	53
Mixer_Static_Duct	2	3	3	11
Mixer_Static_Pipe	2	5	5	12
Motor_AC	1	2	2	6
Motor_DC	1	17	17	46
Motor_Hydraulic_Vane	1	4	4	11
Power Supply_Uninterruptable	2	4	4	12

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<b>Component</b>	<b>Functions</b>	<b>Failures</b>	<b>Effects</b>	<b>Causes</b>
Power Unit_Hydraulic_Gear Pump_Self Contained	3	18	18	45
Power Unit_Hydraulic_Piston Pump_Reservoir Mounted	4	29	29	70
Press_Screw_Dewatering_Belt Driven	3	19	19	48
Pump_Axial_Belt Driven	4	21	21	67
Pump_Centrifugal_Mag Drive_Close Coupled	3	16	16	49
Pump_Centrifugal_Mag Drive_Flex Coupled	3	18	18	57
Pump_Centrifugal_Motor Drive	4	22	22	70
Pump_Centrifugal_Submersible	4	16	16	43
Pump_Diaphragm_Metering	3	13	13	39
Pump_Diaphragm_Pneumatic	2	14	14	34
Pump_Drum_Pneumatic Cylinder	2	11	11	25
Pump_Gear_Three Screw	3	20	20	53
Pump_Gear_Two Screw	3	19	19	51
Pump_Lobe_Belt Drive	3	20	20	52
Pump_Lobe_Gear Drive	3	25	25	68
Pump_Lobe_Motor Drive	3	19	19	51
Pump_Piston_Reciprocating_Multiplex_Gear Drive	3	25	25	76
Pump_Piston_Reciprocating_Multiplex_Motor Drive	3	19	19	60
Pump_Piston_Reciprocating_Simplex_Gear Drive	3	23	23	70
Pump_Piston_Reciprocating_Simplex_Motor Drive	3	17	17	54
Pump_Piston_Reciprocating_Steam Piston Drive	2	15	15	50
Pump_Plunger_Multiplex_Gear Drive	3	21	21	69
Pump_Plunger_Multiplex_Motor Drive	3	17	17	57
Pump_Plunger_Simplex_Gear Drive	3	19	19	62
Pump_Plunger_Simplex_Motor Drive	3	15	15	51
Pump_Plunger_Steam Piston Drive	2	13	13	45
Pump_Progressive_Cavity	1	69	69	102
Pump_Vacuum_Liquid Ring	4	26	26	69
Pump_Vane_Belt Drive	3	17	17	48
Pump_Vane_Gear Drive	3	22	22	64
Pump_Vane_Motor Drive	3	16	16	47
Rupture Disc_Metallic	1	4	4	5
Scale_Hopper	3	12	12	37
Scale_Impact	3	9	9	27
Scale_Platform	2	8	8	27

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<b>Component</b>	<b>Functions</b>	<b>Failures</b>	<b>Effects</b>	<b>Causes</b>
Screen_Dewatering_Gravity Operated	2	9	9	23
Screen_Grizzly	2	5	5	12
Screen_Sifter	3	21	21	62
Settler_Tank_Liquid-Vapor	2	4	4	7
Settler_Tank_Solids-Liquid	3	15	15	45
Silo_Activated_Air Fluidized	1	11	11	31
Silo_Activated_Gyratory Bottom_Belt Discharge	1	13	13	37
Silo_Activated_Screw Bottom_Screw Discharge	1	15	15	45
Silo_Static_Pneumatic Vibrator Discharge	1	9	9	26
Soot Blower_Fixed_Motor Drive	3	15	15	38
Soot Blower_Retractable_Rack and Pinion Drive	3	18	18	49
Soot Blower_Retractable_Screw Drive	3	17	17	46
Stack_Refractory Lined	3	6	6	18
Std Belt Drive	1	2	2	4
Std Chain Drive	1	1	1	4
Std Coupling_Flexible_Elastomeric Insert	1	1	1	2
Std Coupling_Flexible_Gear	1	2	2	6
Std DCS Communication	1	2	2	4
Std Electric Motor	1	2	2	7
Std Flange Gasket	1	1	1	3
Std Gearbox	1	1	1	3
Std Pipe Fitting	1	4	4	10
Steam Trap_Balanced Pressure	2	8	8	15
Steam Trap_Bimetallic	2	8	8	15
Steam Trap_Disc	2	7	7	12
Steam Trap_Float and Thermostatic	2	10	10	19
Steam Trap_Inverted Bucket	2	9	9	16
Steam Trap_Labyrinth	2	7	7	13
Steam Trap_Liquid Expansion	2	8	8	15
Steam Trap_Orifice	2	7	7	13
Steam Trap_Piston	2	7	7	12
Strainer_Rotary_Gearmotor Driven	3	15	15	37
Strainer_Wye	2	4	4	12
Switch_Railroad_Manual	2	7	7	16
Switchgear_Circuit Breaker_Low Voltage	2	6	6	11

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Component	Functions	Failures	Effects	Causes
Switchgear_Fused Disconnect	1	6	6	10
Switchgear_Fused Disconnect_Low Voltage	3	4	4	7
Tank_Atmospheric_Lined Steel	6	14	14	41
Tank_Atmospheric_Lined Steel_Heated	12	34	34	108
Tank_Atmospheric_Metallic	5	13	13	39
Tank_Atmospheric_Metallic_Heated	5	15	15	48
Tank_Atmospheric_Nonmetallic	5	13	13	37
Tank_Mixing_Atmospheric_Metallic	6	16	16	51
Tank_Mixing_Atmospheric_Nonmetallic	6	16	16	49
Tank_Mixing_Pressure_Metallic	6	15	15	48
Tank_Mixing_Pressure_Metallic_Heated	5	14	14	45
Tank_Mixing_Pressure_Nonmetallic	6	16	16	49
Tank_Pressure_Air Receiver	2	7	7	17
Tank_Pressure_Lined Steel	6	13	13	38
Tank_Pressure_Metallic	5	12	12	36
Tank_Pressure_Metallic_Heated	5	14	14	45
Tank_Pressure_Nonmetallic	5	12	12	34
Transformer_Step-down	1	6	6	13
Turbine_Steam_Single Stage	3	17	17	40
Valve_Backflow Preventer	2	15	15	35
Valve_Ball_Manual	2	13	13	40
Valve_Ball_Motor Actuator	5	19	19	53
Valve_Ball_Pneumatic Actuator	5	23	23	62
Valve_Butterfly_Manual	2	13	13	39
Valve_Butterfly_Motor Actuator	4	18	18	49
Valve_Butterfly_Pneumatic Actuator	4	22	22	58
Valve_Check_Ball	3	11	11	28
Valve_Check_Duckbill	3	8	8	15
Valve_Check_Foot	3	9	9	19
Valve_Check_Lift	3	11	11	27
Valve_Check_Piston	4	13	13	30
Valve_Check_Split Disc	3	11	11	27
Valve_Check_Swing	3	8	8	19
Valve_Check_Tilting Disc	3	11	11	27
Valve_Diaphragm_Air Operated	2	13	13	32

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<b>Component</b>	<b>Functions</b>	<b>Failures</b>	<b>Effects</b>	<b>Causes</b>
Valve_Diaphragm_Manual	2	9	9	23
Valve_Diaphragm_Self Contained Back Pressure Control	2	11	11	26
Valve_Diaphragm_Self Contained Pressure Control	2	11	11	26
Valve_Gate_Manual	2	9	10	32
Valve_Gate_Motor Actuator	4	15	16	46
Valve_Gate_Pneumatic Actuator	4	18	19	52
Valve_Globe_Float Operated	2	6	6	10
Valve_Globe_Manual	2	10	10	25
Valve_Globe_Pneumatic Operator	3	23	23	47
Valve_Needle_Manual	2	10	10	25
Valve_Pinch_Air Operated	2	13	13	32
Valve_Pinch_Manual	2	8	8	21
Valve_Plug_Manual	2	14	14	40
Valve_Plug_Motor Actuator	4	20	20	52
Valve_Plug_Pneumatic Actuator	4	24	24	61
Valve_Relief	2	6	6	10
Valve_Rotary Airlock	2	10	10	29
Valve_Slide Gate_Solids	3	16	16	43
Washer_Rallcar_Wash Arm	2	6	6	18
Washer_Tank	2	3	3	8