

10 Charleston (ChP) Plant Specific Section Revision 5 - October, 2010

All prior editions are obsolete and should not be used.

This document is controlled by:

Robert Bosch LLC

ChP/TEF

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It is the user's responsibility to assure that only the latest revision of this standard is used.

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NOTE: Plant Specific Section 10 is a supplement to the GDS and should therefore not contradict the core GDS sections 1-9. Should any contradiction occur, the core GDS shall govern.

10.1 General Procedures

10.2 Project Management

10.2.1 Total Predictive Maintenance (TPM)

TPM best practices shall be discussed at the Design Review meetings and will also be evaluated at pre/final acceptance (See 10.4.2).

10.3 Environmental Safety & Health

10.3.1 Preferred Ventilation Systems for Mist Control

10.3.1.1 Standard Mist Control Equipment Absolent

Sources: [units are manufactured in Sweden]

North American Area Manager:

Industrial Air Quality, Inc.

102 Ag Drive

Youngsville, NC 27596

919-562-7181[202]

1-800-232-9559

Web Sites: <http://www.absolent.com> <http://www.industrialairquality.com>

10.3.1.2 Types of Mist Collectors for oil and water based coolants:

ODF-Series (seven models, light mist/smoke, 350 – 5,000 cfm and 143 – 1940 pounds)

ODFS-Series (five models, medium mist/smoke, 390 – 5,000 cfm and 253 – 1940 pounds)

ODR-Series (nine models, heavy mist/smoke, 2,200– 25,000 cfm and 2,350 – 15,800 pounds)

10.3.1.3 Assistance with Sizing and Application

Contact the US North American Area Manager and Swedish OEM for sizing units, quotes, and technical questions. Bosch Facilities and HSE departments have unit specifications and can assist in selection and budget level information.

Power shall be controlled by the machine being serviced by the mist collector such that the mist collector is secured by the machine in case of fire or emergency shutdown. For central systems, Bosch shall provide a lockable starter. For individual units, supplier shall route power through a starter in the machine.

Oil based coolant applications shall have a fire damper installed in the ducting between the machine and mist collector. Contact HSE to determine if an ABC fire suppression canister is required.

10.4 Bosch Production System

10.4.1 Cabinets, Tables, Chairs

Cabinets/Workbenches Supplier: Lista - Color: SN # Sand

Work Tables Supplier: Bosch Rexroth

Clean room Chairs Supplier: BIO-FIT via Regional Material Handling

Item 4Q70-1000-684-Black vinyl grade 2, 17½" - 22½" in seat height, class 1000 clean room chair, black vinyl seat and back rest, floor guides

Item 4P70-1000-684-Black - Same with footrest

Item 4Q41-1000-UA-684-Black - Same with armrests

Item 4P41-1000-UA-684-Black - Same with armrests and footrest

Item 4Q57-1000-CRC-4A-684-Black – Same with casters

Item 4P57-1000-CRC-4A-684-Black – Same with casters and armrests

Note: Please contact the Industrial Engineer for determining the correct application/ordering.

10.4.2 Total Predictive Maintenance (TPM)

TPM Pillar 4 Best Design Practices shall be incorporated into new machinery. To facilitate this, the topics in the TPM Design Review Checklist shall be discussed in the Project Review meetings and incorporated into the design where applicable.

10.5 Design

10.5.1 Mechanical Design

10.5.1.1 Preferred Mechanical Components

Toggle Clamp	Destaco Brauer
Springs	Associated Springs-Raymond (SPEC) Lee Spring Co. Danly Die Springs Century Spring
Ball and Roller Bearings	INA Bearing Co., Inc. FAG SKF Industries, Inc.
Shock Absorbers	ACE Controls Inc
DU Bearings	Garlock Bearings Inc, INA
Locking Nuts	Spieth
O-Rings	Apple Rubber Products, Inc Simrit Corporation (Freudenberg)
Slides and Guides	Bosch Rexroth THK Co, LTD Thomson Industries, Inc Hepco Schneeberger INA Linear Technik, Inc IKO Starr
Structural Sections	Bosch Rexroth FMS
Pick/Place & Grippers	Bosch Rexroth PHD Schunk SMC
CNC's	Bosch Rexroth
Robots	Staubli Adept Unimate
Part Feeders	Moorfeed Performance Feeders VibroMatic
Stepping Motors	Bosch Rexroth Berger Compumotor
Torque Systems	Bosch Rexroth
Press Spindles	Bosch Rexroth Promess
Hydraulic Equipment	Bosch Rexroth
Air Dryer/Extractor	LA-MAN Reading Technologies

10.5.1.2 CAD Files

Charleston Plant requires 2D or 3D sample drawings to be supplied in their electronic format to ChP/TEF2.1 prior to start of final design. Three sample drawings required are: an assembly drawing, a detail drawing including symbols, ISO tolerances and dimensions, and a parts list. If a company’s native format cannot be translated successfully, the company will be required to translate their drawings into another format as specified by ChP/TEF2.1 and to resubmit the drawings.

Any additional changes must be resubmitted via a new CD upon completion of the project.

One (1) set of all drawings submitted with the machines (see Section 8, pt. 8.1.2) must be forwarded to the ChP/TEF2.1.

FORMAT OF CAD DRAWING FILES

Mechanical Drawings		Floor Layout Drawings	Electrical Drawings
2D	ME10/CoCreate MI DXF, DWG	Microstation DGN DWG DXF	E-PLAN DWG DXF
3D	SolidWorks ParaSolid STEP 204, 214	IGS	

10.5.1.3 Paint

Equipment	Color
Component Mfg. Assy. & Test	“Light Grey” RAL 7035 – HR* or lighter shades
Lab, Tool Room	Manufacturer’s colors are acceptable

10.5.2 Electrical Design

10.5.2.1 Design Styles

The Charleston Plant has different styles of electrical hardware and software design, **ATMO** from Feuerbach Germany or **BhP** from Blaichach Germany. Find out from the Project Engineer which electrical design style to use. Select standard control systems, software and programming methodology, and electrical parts appropriate for the specific design Design Style. A list of standard components is available from Chuck Bevers ChP/TEF1.

10.5.2.2 Programmable Controllers

10.5.2.2.1 Symbols & Comments

Symbolic names in English shall be used exclusively in place of the physical addresses. Comments shall be in English.

10.6 Energy Conservation

- 10.6.1 Overview - Robert Bosch, LLC strives to promote the preservation of a sustainable environment, including efficient energy usage. Equipment purchased shall adhere to this philosophy, of which details are outlined below.
- 10.6.2 Formal Quotation Requirements for Energy Conservation
- 10.6.2.1 As part of the quote, the machine builder shall provide the efficiency of each machine component and identify components that can be upgraded with energy efficient replacements for standard components. As a guideline, energy efficient upgrades shall be implemented if the payback period due to energy savings is less than the expected life cycle of the equipment.
- 10.6.2.2 As part of the Proposal Description Section (1.2.4) the machine builder shall provide estimated utility usage required (e.g. electricity, compressed air, natural gas) in each mode of operation (Sleep, Idle, Run, See 9.7) on the Machine Data Sheet (Appendix 2.1).
- 10.6.3 Electrical Component Requirements
- 10.6.3.1 AC induction motors shall be of the “premium” efficiency class IE3 (IEC 60034-30).
- 10.6.3.2 Pump motors shall be driven by variable speed inverter drives to modulate the required pressure or flow rather than utilizing relief devices to dissipate any excess. All motors, including constant speed motors (such as on conveyors) shall have automatic shutoff in order to run only when needed.
- 10.6.3.3 Machine lighting shall be LED where available, and high efficiency electronic ballast fluorescent elsewhere.
- 10.6.3.4 All transformers shall have high energy efficiency ratings, utilizing copper windings and low temperature rise (80°C dry-type and 55°C wet-type).
- 10.6.3.5 Cooling requirements for electrical cabinets shall take into consideration the environment into which they will be placed and provide cooling only when necessary.
- 10.6.4 Pneumatic Component Requirements - Vacuum shall be generated by efficient electric vacuum pumps rather than via air powered vacuum generators.
- 10.6.5 Insulated Surfaces - Heated or chilled fluids shall have their tanks, piping, fittings and devices insulated to the thickness recommended by ASHRAE 90.1 to prevent heat loss, as long as the insulation material does not interfere with maintenance requirements.

10.6.6 Machine Modes of Operation

In order to limit the amount of energy the machine will use during idle (non-production) time, the machine builder shall provide the following modes of operation.

- 10.6.6.1 Run Mode is defined as a state in which the machine is actively producing parts.
 - 10.6.6.2 Idle Mode – Idle mode is a state in which machine components required to actively produce parts have been powered down, but the machine has the ability to start producing again without warm up or calibration time. This can include certain motors, heaters, lighting, display, conveyors, etc. The machine shall automatically enter this mode if no parts are produced for 5 minutes. The machine shall automatically revert to active mode upon the arrival of a new part or other cycle start indicator, provided this automatic start up complies with safety requirements. The Green LED signal lamp shall flash slowly (1s period) while the machine is in Idle Mode.
 - 10.6.6.3 Sleep Mode – Sleep Mode is when only essential machine functions remain energized. This typically includes only the machine controller. An automatic shutdown process to enter Sleep Mode shall occur after not producing parts for a period of 1 hour. The Amber LED signal lamp shall flash slowly while the machine is in Sleep Mode.
 - 10.6.6.4 Startup - Machines that require more than 10 minutes to power up and reach Run Mode shall have a configurable “Wake Up Alarm” which can be set to automatically initiate the power up of machine components at a predetermined time in order to reach Ready Mode, provided this start up complies with safety requirements. The only difference between Ready Mode and Idle Mode is that Ready Mode will not switch to Run Mode without operator action.
- 10.6.7 Machine Utility Usage Metering - The machine shall have totalizing meters which record the usage of each utility (Electricity, Compressed Air, Chilled Water, etc.)