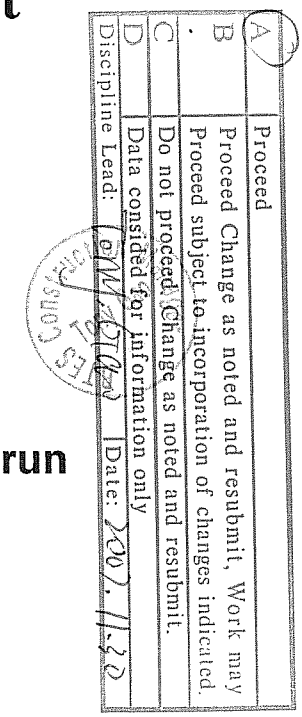
Bayer Isocyanate & PET Project

MDI Train - Tank Farm

EPC Project



Scheme for single pump equipment trial run

泵类设备单机试运方案

BTES Contract No.:2006 166 001 IBL 00 102 20060529 PO 00

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2	For Implementation	0	Zhu Xiang			
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中国石化集团南京设计院SINOPEC NANJING DESIGN INSTITUTE	Project Name	拜耳异氰酸酯和聚醚项目MDI联合装置罐区 BAYER ISOCYANATE & PET PROJECT MDI TRAIN - TANK FARM
	Area	TANKFARM
	Doc.Name	Scheme for single pump equipment trial run
	Doc.No.	7005-000-0-00-006-077

A2

施工组织设计（方案）报审表

工程名称：拜耳异氰酸酯和聚醚项目MDI联合装置罐区　　编号：7005-000-FA-053

致 上海协同工程监理造价咨询有限公司：

我方已根据施工合同的有关规定完成了拜耳MDI罐区泵类设备单机试运方案 的编制，并经我单位上级技术负责人审查批准，请予以审查。

附：泵类设备单机试运方案

承包单位（章）：

项目经理：

日　　期：2007.11.17

专业监理工程师审查意见：

在施工过程中，应严格遵循本方案的程序和要求，认真执行。

专业监理工程师：

日　　期：2007.11.17

总监理工程师审核意见：

同意本方案

项目监理机构：

总监理工程师：

日　　期：2007.11.30

本表由承包单位填写，连同方案一份一并送监理单位审查，建设、监理、承包单位各留一份。

Bayer Isocyanate & PET Project MDI Train-Tank Farm

拜耳异氰酸酯和聚醚项目MDI联合装置罐区

Scheme for single pump equipment trial run

泵类设备单机试运方案

The Second Construction Company Of Sinopec
中国石化集团第二建设公司

建筑工程A-1

施工方案报审表

工程名称：拜耳异氰酸酯和聚醚项目MDI联合装置罐区　　建设单位：拜耳公司

设计单位：南京设计院　　施工单位：中国石化第二建设公司

监理单位：上海协同工程监理造价咨询有限公司　　总监理工程师：徐敏

编制人：朱祥　　编制日期：

项目经理：

施工单位审批	技术负责人：　审批意见：同意 施工单位有关部门： 工程（项目）部： 技术质量科： 安全科：
总承包单位审批	总承包单位有关科室： 工程： 质量： 安全： 材料：
建设（监理）单位	总监理工程师：　审批意见：同意
备注	

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一、 工程概况 General situation of project

拜耳异氰酸酯和聚醚项目 MDI 联合装置罐区 V911、V912、V913 总共有 68 台泵，与 V911 储罐相连的泵以及与 V912-TA92-BA001/005/007/008/012 储罐相连的泵不进行单机试运其余都进行单机试运（其它不进行单试的泵在生产车间开车时由我单位现场配合），试运介质碳钢部分选用消防水，不锈钢部分选用 CL-不大于 25MG/L 的纯净水（见表一）。There are 68 pumps in total in the MDI Complex tank farms V911, V912 & V913 of Bayer Isocyanate & Polyether Project. Single unit trial run is required all pumps except connected with V911 tanks and V912-TA92-BA001/005/007/008/012 tanks(For these not put into operation pumps, we will cooperate with the production workshop on the site during startup). Fire water is selected for carbon steel part and pure water with Cl- not more than 25 mg/l is selected for stainless steel part as trial run media (see Table 1).

二、 编制依据 Preparation Basis

1、 中国石化集团南京设计院提供的施工图 Construction drawings provided by Sinopec Nanjing Design Institute

2、 拜耳异氰酸酯和聚醚项目 MDI 联合装置安装工程质量计划 / 施工组织设计 Quality plan / constructional organization design for installation of Bayer Isocyanate & Polyether Project MDI Complex

3、 石油化工设备安装工程质量检验评定标准 Inspection and Evaluation Standards for Installation Quality of Petrochemical Equipment SH3514-2001

4、 机械设备安装工程施工及验收通用规范 General Code for Construction & Acceptance of Installation of Mechanical Equipment GB50231-98

5、 压缩机、风机、泵安装工程施工及验收规范 Code for Construction & Acceptance of Installation of Compressor, Fan & Pump GB50275-98

6、 化工机器安装工程施工及验收规范 （化工用泵） Code for Construction & Acceptance of Installation of Chemical Machine HGJ207-83

7、 机械设备随机技术资料 Technical data supplied along with the mechanical equipment

8、 化工机器安装工程施工及验收通用规范 General Code for Construction & Acceptance of Installation of Chemical Machine HG20203-2000

三、 泵类设备试运 Pump equipment trial run

1、 单机试运前应具备的条件 Conditions that shall be available prior to single unit trial run

① 地脚螺栓应紧固完毕，二次灌浆达到设计强度，抹面工作应结束； The foundation bolts shall be tightened completely, the secondary grouting shall reach the design strength and the float work shall be finished;

② 与泵连接的工艺管线已试压并冲洗完毕，与泵体连接法兰及支吊架安装正确，泵入口管线如无过滤器应加设临时过滤网（具体规格形式选用见附图，过滤网已在制造厂定制成品）； The process pipeline connected with the pump shall be tested hydraulically and flushed completely, the flange, bracket and hanger

connected with the pump body shall be installed correctly, the pump inlet pipeline shall be provided with temporary filter screen if no filter is provided(Concrete specification selects as the attached drawing , the fliteration net finished products already in the manufactory);

③ 各指示仪表应灵敏、可靠并已经调校完毕； The individual indication instruments shall be sensitive, reliable and calibrated completely;

④ 电机绝缘电阻符合设计规定，电气已受电； The insulation resistance of electric motor shall meet the design regulations and the electrical equipment has been energized;

⑤ 按使用说明书规定（或设计要求）的润滑油要求将润滑油加注完毕,在加注之前将原轴承箱内油排净，用煤油灌满清洗后加入合格的润滑油，润滑油必须采购指定供应商 TOTAL。加润滑酯的泵在单试时不更换润滑（见附表二：润滑油、酯规格表）。 The lube oil shall be filled completely as per lube oil requirements specified in the instructions (or design requirements). The oil in the existing bearing housing shall be drained completely prior to filling and the qualified lube oil shall be filled after cleaning with kerosene completely,and the lube oil must purchase appointing supplier TOTAL.The lube oil shall not be replaced during single unit trial run of pump filled with lubricating grease (see attached Table II: lube oil and grease specifications).

⑥ 泵与电机对中完毕。 The pump shall be aligned with electric motor completely.

⑦ 应做好配管无应力检查，并经 BPS（BMS）相关工程师确定完毕。 The piping shall be inspected properly for stress free and confirmed by associated BPS（BMS）completely.

2、 电动机单机试车 Single electric motor trial run

按施工规范要求，在进行单机试运转前，必须对驱动电机进行考核，考核合格后才可以进行泵的试运转。 The drive motor must be tested for performance as per construction code prior to single unit trial run. The trial run of pump can be carried out only after the performance test is qualified.

将泵与电机脱开后，点动电动机确定转向是否正确，如不正确，则需要重新接线。 After disconnected the pump from the motor, bump start the motor to check the rotation. If not correct, rewire the motor.

启动电动机进行连续试运行，电机需连续试运转 2 个小时，试运过程中需对电机轴承及定子温度进行监测，滑动轴承的温升不应超过 35℃，最高温度不应超过 65℃；滚动轴承温升不应超过 40℃，最高温度不应超过 75℃。 Start the motor for continuous trial run for 2 hours. Monitor the temperature of its bearing and stator during the trial run. The temperature rise of sliding bearing shall not exceed 35℃ (max 65℃) and that of rolling bearing shall not exceed 40℃ (max 75℃).

3、 联轴器对中复核 Recheck the coupling for alignment

电机单试后，对电机与泵的联轴器对中数据进行复核，如符合规范或随机技术资料的要求，将联轴器恢复。 Recheck the alignment data for coupling between the motor and pump after single trial run of the motor and recover the coupling if the data meets the code or associated technical data requirements.

4、 泵单机试运 Single pump trial run

4.1 离心泵的试运转过程如下： The trial run process of centrifugal pump is as follows:

① 将试运部分的临时管线连接完毕（见附件：单泵试运系统图），试运用容器内灌满试运介质，检查试运流程，确保管路上的阀门处于预定的打开或关闭状态，将其余的阀门或管路封闭，并作上标记； Connect the temporary pipeline of trial run part completely (see attachment: single pump trial run system diagram). Fill the trial run container fully with trial run media and check the trial run flow to ensure that the valve on the pipeline is in the predetermined open or close status. Enclose the rest valves or pipelines and mark them accordingly.

② 打开泵的进口阀门，使泵内充满试运介质（打开泵或管路上的放空口或排净口检查，确认后及时封闭）； Open the pump inlet valve to fill the pump fully with trial run media (open the vent or drain on the pump or pipeline to check the filling and enclose them in a timely manner after confirmation).

③ 手动盘车数圈进行检查，应灵活无卡涩现象； Rotate it for several turns manually, which shall be flexible and free from seizing.

④ 点动电动机，确定机械部分无异常现象； Bump start the motor to determine that the mechanical part is free from abnormality.

⑤ 起动电机，待泵出口压力稳定后，缓缓打开出口阀门调节流量及压力，待出口压力达到额定压力并稳定后进行连续试运转，在关闭出口阀门的情况下，泵连续运转时间以不超过3min为宜； Start the motor and, after the pump outlet pressure is steady, open the outlet valve gradually to regulate the flow and pressure. After the outlet pressure reaches the rated pressure and becomes steady, carry out continuous trial run. The continuous running time should not exceed 3 min when the outlet valve is closed.

⑥ 离心泵在额定压力及流量下连续试运行 4h，试运时每半小时测量一次轴承及工作介质的温度，滑动轴承温升不应超过 35℃，最高温度不应超过 65℃，滚动轴承温升不应超过 40℃，最高温度不应超过 75℃； Carry out continuous trial run of centrifugal pump under rated pressure and flow for 4 hours. Measure the temperature of bearing and working media every half hour during the trial run. The temperature rise of sliding bearing shall not exceed 35℃ (max 65℃) and that of rolling bearing shall not exceed 40℃ (max 75℃).

⑦ 在轴承体上轴承、垂直及水平三个方向测量振动值，其数值应不超过下表中的数值； Measure the vibration values on the upper bearing, vertical and horizontal directions of the bearing body, which shall not exceed those in the table below.

⑧ 试运转合格后，关闭泵出口阀门，停泵，将试运容器及泵内的试运介质全部排净，以防生锈或腐蚀。 After the trial run is qualified, close the pump outlet valve, stop the pump and drain the media in the trial run container and pump completely to avoid rusting or corrosion.

表一：离心式机器轴承处的振动允许值

Table I: Allowable vibration values at centrifugal machine bearing

序号 No.	转速 rpm Speed of rotation	允许振动值 mm Allowable vibration value
1	≤375	0.18
2	>375~600	0.15
3	>600~750	0.12
4	>750~1000	0.10

5	>1000~1500	0.08
6	>1500~3000	0.06
7	>3000~6000	0.04
8	>6000~12000	0.03
9	>12000	0.02

对于自带有密封冲洗、冷却缓冲罐的泵，在试运时因无合适的介质作为密封液，只能使用水作为密封液。 We can only use water as sealing liquid for pumps with self-retained sealing flushing and cooling surge tanks since no suitable media is available during trial run.

5、 泵的试运流程 Pump trial run flow

泵试运需要建立起试运流程，即试运介质从试运容器到试运的泵,再到试运容器建立起循环。因为部分泵的进口管线和出口管线不能建立起循环，试运流程无法打通，需要接临时管线。（具体见试运流程图） It is necessary to set up a flow for pump trial run, that is, set up a circulation of trial run media from the container to pump and back to container. Since it is unable to set up a circulation for the inlet/outlet pipelines of some pumps, the trial run flow cannot get through, therefore it is necessary to connect temporary pipeline (see trial run flow diagram for details).

四、 质量保证措施 **Quality assurance measures**

1、 严格质量管理制度，实行现场"三级"检查制度，现场设一名专职质检员，负责现场的质量监督和检查工作。 Observe QC system strictly. Carry out on-site "3-level" inspection system. Assign a full-time quality inspector for quality supervision and inspection on the site.

2、 机械设备运转过程中应无异常噪声．声响等现象。 The mechanical equipment shall be free from abnormal noise and sound, etc. during the running.

3、 机械设备的振动值应符合机器技术文件的规定，如技术文件无要求，则以规范要求为准（通用规定）。 The vibration values of mechanical equipment shall meet the regulations of technical documents. If there are no requirements in the documents, follow the code requirements (general purpose regulations).

4、 泵压力应符合设计要求，电机电流不超过其额定值，泵的流量不低于额定值的20%。 The pump pressure shall meet the design requirements. The motor current shall not exceed its rated value. The pump flow shall not be lower than 20% of its rated value.

5、 班组要做好自检自查工作，严把质量关。 The teams and groups shall inspect and check the quality by themselves properly and strictly.

6、 如发现异常现象应立即停机检查。 If find out abnormalities, stop the machine and inspect the cause.

7、 管道应连接牢固无渗漏。 The pipeline shall be connected firmly without leaking.

8、 试运完毕后，管道及设备中的水需要及时排净，以防冻坏。 After trial run, drain the water in the pipeline and equipment to avoid freeze off.

五、 安全要求事项 **Safety precautions**

1、 试运转前，应设立警戒区域，由技术人员和施工人员联合进行检查，消除隐患，严禁在泵及泵轴旋转范围内遗留杂物或工具； Prior to trial run, set up the alert area. The technical and construction personnel shall inspect jointly to eliminate hidden dangers. It is prohibited to leave debris or tools in the scope of pump and pump shaft rotation.

2、 参加泵试运人员要统一指挥，熟知方案和试运程序，严格执行，无关人员严禁参与操作，严格受送电操作票制度； The personnel participating in the pump trial run shall be under unified instruction and familiar with the scheme and procedure for the trial run. The unrelated personnel are prohibited to take part in the operation. Observe the work permit system for power energization and distribution strictly.

3、 在泵运转时，不得擦拭或修理，发现有异常情况需要修理时，必须先切断电源；Do not clean or repair the pump during the running. When it is necessary to repair the pump in case of abnormality, the power supply must be disconnected first.

4、 泵未停稳前，不得用手，脚或物件强制制动； Do not stop the pump with hand, foot or object by force before it is stopped steadily.

5、 泵试运结束后，管线及泵内的积水立即排除干净，必要时用压缩风吹扫干； After the pump trial run, drain the accumulated water in the pipeline and pump completely and purge them with compressed air if necessary.

6、 *在试运过程中，必须有经过项目部培训的操作人员进行泵操作，如发生紧急情况，参与试运的任何人员均有权紧急停车。 During the trial run, all person participating in the trial run should trained by project office,and any person participating in the trial run has the right to shut down the pump in case of emergency.*

六、 组织机构安排 **Organization and arrangement**

为使设备单机试车顺利进行，在项目部内部成立试车执行小组，其人员组成如下： To facilitate the single equipment trial run, set up a trial run executive team in the Project Dept. The team members are as follows:

组长： 胡高升
Team leader: Hu Gaosheng

组员： 朱祥、岳仕辉
Team members: Zhu Xiang, Yue Shihui

现场实际操作人员在试车时视情况决定，人员尽量保证相对固定。试运时按各自分工明确职责，统一指挥，试运时需相关部门协调时，由项目部组织。 The number of actual operators on the site is subject to the conditions during the trial run. Ensure relatively fixed personnel as much as possible. Specify the responsibilities as per division of work for each person under unified instructions during the trial run. When the coordination by associated departments is required during the trial run, it shall be organized by the Project Dept.

七、 施工安排 **Construction arrangement**

1、 V911 区 2 台泵试车计划于 2007 年 11 月 18 日至 2007 年 11 月 19 日； Carry out the trial run plan for 2 pumps in Area V911 from November 18, 2007 to November 19, 2007;

2、 V912 区 8 台泵试车计划于 2007 年 11 月 20 日至 2007 年 11 月 23 日；Carry out the

trial run plan for 8 pumps in Area V912 from November 20, 2007 to November 23, 2007;

3、 V913 区 30 台泵试车计划于 2007 年 11 月 24 日至 2007 年 12 月 5 日；Carry out the trial run plan for 30 pumps in Area V913 from November 24, 2007 to December 5, 2007.

八、 劳动力安排 **Labor force arrangement**

表二：劳动力计划
Table II. Labor force plan

序号 No.	工种 Type of work	人数 Number of people
1	钳工 Fitter	4
2	电工 Electrician	1
3	管工 Plumber	2
4	电焊工 Electric welder	1
5	火焊工 Fire welder	1

九、 主要施工机具和手段用料 **Major construction machinery, means and materials**

1、 主要施工机具见表三： See Table III for major construction machinery

表三：主要施工机具一览表
Table III. List of major construction machinery

序号 No.	施工机具 Construction machinery	单位 Unit	数 量 Quantity
1	电焊机 Electric welding machine	台 Set	2
2	5t 倒链 Chain hoist, 5t	台 Set	1
3	3t 倒链 Chain hoist, 3t	台 Set	1
4	10t 千斤顶 Jack, 10t	台 Set	1
5	压滤机 Press filter	台 Set	1
6	空压机 Air compressor	台 Set	1
7	磨光机 Abrader	台 Set	2
8	火焊工具 Fire welding machine	套 Set	1

2、 试运机具见表四： See Table IV for trial run machinery

表四：试运机具一览表
Table IV. List of trial run machinery

序号 No.	名称 Description	规格 Size	单位 Unit	数量 Quantity

1	红外线测温仪 Infrared thermometer		块 Piece	1
2	测振仪 Vibration meter		块 Piece	1
3	磁力表座 Magnetic force gauge stand	600N	套 Set	6
4	百分表 Dial indicator	0~5mm，精度 0.01mm 0~5mm, accuracy 0.01mm	块 Piece	2
		0~10mm，精度 0.01mm 0~10mm, accuracy 0.01mm	块 Piece	5
5	转速表 Tachometer		台 Set	1
6	对讲机 Walkie-talkie		对 Pair	1

3、 手段用料及消耗材料见表五： See Table V for the means, materials and consumable materials

表五：手段用料及消耗材料一览表
Table V. List of means, materials and consumable materials

序号 No.	材料 Materials	规格型号 Size and type	单位 Unit	数量 Quantity	备注 Remarks
1	黄油 Grease		kg	15	防护 Protection
2	电钻钻头 Electric drill bit	Φ4	根 Piece	5	
3	消防水带 Fire hose		m	100	上水 For water supply
4	镀锌铁丝 Galvanized iron wire	Φ3	kg	40	设备防护 Equipment Protection
5	耐油非石棉板 Oil resistant non-asbestos board	δ=2mm	m^2	15	垫片 Gasket
6	钢板 Steel plate	δ=2mm	m^2	5	临时过滤网 Temporary filter screen
7	生料带 Raw material strip		卷 Roll	20	
8	破布 Rag		kg	50	
9	钢板 Steel plate	δ=10mm	m^2	9	盲板 Blind plate
10	钢板 Steel plate	δ=20mm	m^2	9	盲板 Blind plate
11	法兰 Flange	3″ 5.0MPa	片 Piece	2	临时管线 Temporary pipeline
12	法兰	3/2″ 15.0MPa	片	1	临时管线

			Piece		Temporary pipeline
14	金属缠绕垫 Metal winding gasket	4″ 2.0MPa	片 Piece	5	恢复管线用 For pipeline recovery
15	金属缠绕垫 Metal winding gasket	3″ 2.0MPa	片 Piece	4	恢复管线用 For pipeline recovery
16	弯头 Bend	3/2″ 800Lb	只 Piece	4	临时管线 Temporary pipeline
17	弯头 Bend	1″ 800Lb	只 Piece	2	临时管线 Temporary pipeline
18	弯头 Bend	3″ 300Lb	只 Piece	4	临时管线 Temporary pipeline
19	阀门 Valve	3/2″ 800Lb	只 Piece	1	临时管线 Temporary pipeline
20	阀门 Valve	1″ 800Lb	只 Piece	1	临时管线 Temporary pipeline
21	钢管 Steel pipe	3″ 300Lb	m	3.5	临时管线 Temporary pipeline
22	钢管 Steel pipe	1″ 800Lb	m	5	临时管线 Temporary pipeline
23	临时过滤网 Temporary filter net				项目部提供 Item office supply
24	钢管 Steel pipe	3/2″ 800Lb	m	15	临时管线 Temporary pipeline

表一：单机试运泵类设备一览表 The schedule of single pump equipment trial run

序号 NO.	位号 ITEM	区域 AREA	额定流量 m^3/h FLOW RATE	扬程 m DELIVERY HEAD	转速 rpm SPEED	比重 SPECIFIC GRAVITY	试运介质 OPERATION MEDIUM	功率 kW POWER
1	AY21PA003	V911	50	52	2900	1.000	消防水 FIRE FIGHTING WATER	30
2	WT12PA001	V911	145	38	2900	1.000	消防水 FIRE FIGHTING WATER	30
3	AY21PA001	V912	30	32	2900	1.000	消防水 FIRE FIGHTING WATER	11
4	AY21PA002	V912	100	32	2900	1.000	消防水 FIRE FIGHTING WATER	15
5	AY21PA003	V912	10	32	2900	1.000	消防水 FIRE FIGHTING WATER	7.5
6	AY21PA004	V912	30	35	2900	1.000	消防水 FIRE FIGHTING WATER	11
7	TA92PA004	V912	55	38	2900	1.077	消防水 FIRE FIGHTING WATER	15
8	TA92PA021	V912	44	225	2900	1.080	消防水 FIRE FIGHTING WATER	110
9	TA92PA022	V912	44	225	2900	1.080	消防水 FIRE FIGHTING WATER	110
10	TA92PA007	V912	110	50	2900	1.080	消防水 FIRE FIGHTING WATER	55
11	TA92PA008	V912	110	50	2900	1.080	消防水 FIRE FIGHTING WATER	55

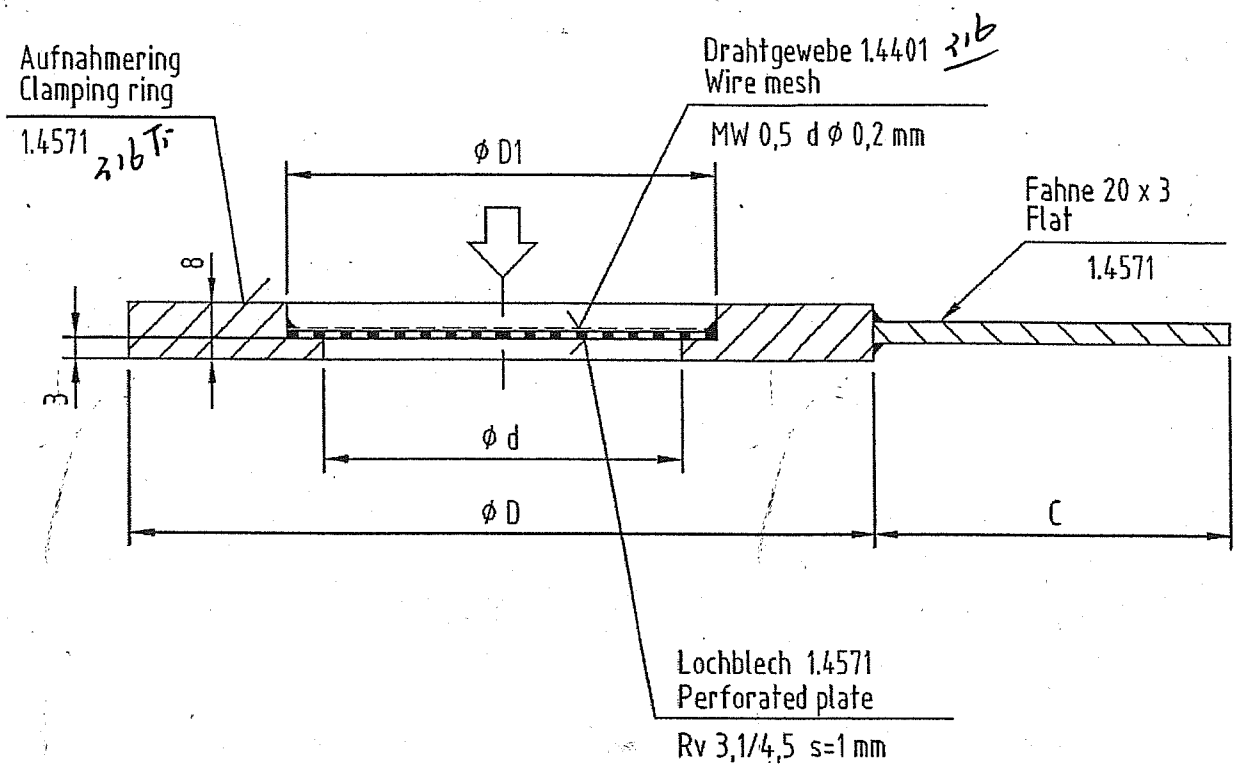
序号 NO.	位号 ITEM	区域 AREA	额定流量 m^3/h FLOW RATE	扬程 m DELIVERY HEAD	转速 rpm SPEED	比重 SPECIFIC GRAVITY	试运介质 OPERATION MEDIUM	功率 kW POWER
12	TA92PA005	V912	55	38	2900	1.077	消防水 FIRE FIGHTING WATER	15
13	TA92PA016	V912	60	51	2900	1.000	消防水 FIRE FIGHTING WATER	30
14	TA92PA017	V912	60	51	2900	1.000	消防水 FIRE FIGHTING WATER	30
15	TA92PA006	V912	38	52	2900	1.000	消防水 FIRE FIGHTING WATER	18.5
16	AY21PA005	V913	90	25	2900	1.000	消防水 FIRE FIGHTING WATER	11
17	AY21PA007	V913	10	26	2900	1.000	消防水 FIRE FIGHTING WATER	7.5
18	AY21PA008	V913	10	30	2900	1.000	消防水 FIRE FIGHTING WATER	7.5
19	TA93PA010	V913	3.5	42	2900	1.600	纯净水 PURE WATER	11
20	TA93PA011	V913	50	130	2900	1.180	消防水 FIRE FIGHTING WATER	75
21	TA93PA012	V913	50	130	2900	1.180	消防水 FIRE FIGHTING WATER	75

序号 NO.	位号 ITEM	区域 AREA	额定流量 m^3/h FLOW RATE	扬程 m DELIVERY HEAD	转速 rpm SPEED	比重 SPECIFIC GRAVITY	试运介质 OPERATION MEDIUM	功率 kW POWER
22	TA93PA013	V913	50	45	2900	1.140	纯净水 PURE WATER	18.5
23	TA93PA014	V913	50	45	2900	1.140	纯净水 PURE WATER	18.5
24	TA93PA015	V913	46	46	2900	1.020	消防水 FIRE FIGHTING WATER	18.5
25	TA93PA016	V913	46	46	2900	1.020	消防水 FIRE FIGHTING WATER	18.5
26	TA93PA017	V913	45	40	2900	1.020	消防水 FIRE FIGHTING WATER	15
27	TA93PA018	V913	45	40	2900	1.020	消防水 FIRE FIGHTING WATER	15
28	AY21PA006	V913	60	26	2900	1.000	消防水 FIRE FIGHTING WATER	11
29	TA93PA021	V913	35	62	2900	1.180	纯净水 PURE WATER	45
30	TA93PA022	V913	3	30	2900	1.180	纯净水 PURE WATER	3
31	TA93PA023	V913	17	54	2900	1.000	纯净水 PURE WATER	11

序号 NO.	位号 ITEM	区域 AREA	额定流量 m^3/h FLOW RATE	扬程 m DELIVERY HEAD	转速 rpm SPEED	比重 SPECIFIC GRAVITY	试运介质 OPERATION MEDIUM	功率 kW POWER
32	TA93PA024	V913	3	28	2900	1.180	纯净水 PURE WATER	3
33	TA93PA025	V913	110	72	2900	1.000	消防水 FIRE FIGHTING WATER	75
34	TA93PA026	V913	25	60	2900	1.000	消防水 FIRE FIGHTING WATER	18.5
35	TA93PA027	V913	135	65	2900	1.000	消防水 FIRE FIGHTING WATER	75
36	AY21PA003	V913	50	32	2900	1.000	消防水 FIRE FIGHTING WATER	7.5
37	AY21PA004	V913	10	35	2900	1.000	消防水 FIRE FIGHTING WATER	11
38	AY21PA009	V913	10	25	2900	1.000	消防水 FIRE FIGHTING WATER	7.5
39	TA93PA008	V913	35	40	2900	1.410	纯净水 PURE WATER	18.5
40	TA93PA009	V913	35	40	2900	1.410	纯净水 PURE WATER	18.5
41	TA93PA028	V913	10	45	2900	1.000	纯净水 PURE WATER	3
42	AB15PA001	V913	0.5	158	1450	0.900	消防水 FIRE FIGHTING WATER	3

序号 NO.	位号 ITEM	区域 AREA	额定流量 m^3/h FLOW RATE	扬程 m DELIVERY HEAD	转速 rpm SPEED	比重 SPECIFIC GRAVITY	试运介质 OPERATION MEDIUM	功率 kW POWER
43	AB15PA002	V913	0.5	158	1450	0.900	消防水 FIRE FIGHTING WATER	3
44	UB13PA001	V913	30	45	2900	1.020	纯净水 PURE WATER	7.5
45	UB13PA002	V913	30	30	2900	1.200	纯净水 PURE WATER	11

Änderungen im Zuge der Weiterentwicklung vorbehalten !
The parts are subjekt to change by technical innovation !



Abmessungen	D	d	D1	s	C
DN 25 PN 16	68	25	35	8	70
DN 50 PN 16	102	51	61	8	70
DN 80 PN 16	138	80	90	8	70
DN 100 PN 16	158	100	115	8	70
DN 125 PN 16	188	125	140	8	90
DN 150 PN 16	212	154	169	8	90
DN 200 PN 16	268	200	220	8	90
DN 250 PN 16	320	244	274	8	90
DN 300 PN 16	378	305	325	8	110
DN 400 PN 16	490	400	420	8	110

\doku\SF\	Datum	Name
gezeichnet	25.09.07	Holterhof
geprüft	25.09.07	Böcking

FK® KROMBACH ARMATUREN

FRIEDRICH KROMBACH
GmbH & Co.KG Armaturenwerke
D-57202 Kreuztal Postfach 1130

Maßstab: %

Scheibensieb
Sieve wafer typ
DN 25-400 / PN 16

Zeichnungs-Nr.: SF 4-829

Ersatz für:
Ersetzt durch:

Project: NCIDI Page:
Client: Print out Data:
Author:

Lubrication list

KU Order	Tag No.	Category	Vendor	Pump Type	Lubrication parts	Lubricant Type (DIN 51502/ISO)	Standard (DIN)	Proposed Product	quantity (L)	first change after	interval [h]	remarks
1.056250.0001	V911 AY21PA003	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0002	V911 WT12PA001	CENTRIFUGAL_PUMP_MC	Klaus Union	NOV	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,50	8000	8000	
1.056250.0003	V912 AY21PA001	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0004	V912 AY21PA002	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0005	V912 AY21PA003	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0006	V912 AY21PA004	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0007	V913 AY21PA003	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0008	V913 AY21PA004	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0009	V913 AY21PA005	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0010	V913 AY21PA006	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0011	V913 AY21PA007	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0012	V913 AY21PA008	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056250.0013	V913 AY21PA009	CENTRIFUGAL_PUMP_MC	Klaus Union	DIA SZ	ball bearing	oil (ISO-VG68)	51519	Mineral Oil	0,35	8000	8000	
1.056259.0001	V911 TA91PA017	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0002	V911 TA91PA018	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0003	V911 TA91PA020	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0004	V911 TA91PA021	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0005	V911 TA91PA023	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0006	V911 TA91PA047	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0007	V911 TA91PA031	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0008	V911 TA91PA032	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0009	V911 TA91PA045	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0010	V912 TA92PA002	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0011	V912 TA92PA003	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0012	V912 TA92PA004	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0013	V912 TA92PA005	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0014	V912 TA92PA006	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0015	V912 TA92PA007	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0016	V912 TA92PA008	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0017	V912 TA92PA011	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0018	V912 TA92PA013	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0019	V912 TA92PA014	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0020	V912 TA92PA015	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0021	V912 TA92PA016	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0022	V912 TA92PA017	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0023	V912 TA92PA019	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	

Project: NCIDI Page:
Client: Print out Data:
Author:

Lubrication list

KU Order	Tag No.	Category	Vendor	Pump Type	Lubrication parts	Lubricant Type (DIN 51502/ISO)	Standard (DIN)	Proposed Product	quantity (L)	first change after	interval [h]	remarks
1.056259.0024	V912 TA92PA021	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM GVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0025	V912 TA92PA022	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM GVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0026	V912 UB21PA001	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0027	V913 TA93PA008	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0028	V913 TA93PA009	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0029	V913 TA93PA010	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NKN	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0030	V913 TA93PA011	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0031	V913 TA93PA012	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0032	V913 TA93PA013	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM SVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0033	V913 TA93PA014	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0034	V913 TA93PA015	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0035	V913 TA93PA016	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0036	V913 TA93PA017	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0037	V913 TA93PA018	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0038	V913 TA93PA021	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0039	V913 TA93PA022	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0040	V913 TA93PA023	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0041	V913 TA93PA024	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0042	V913 TA93PA025	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0043	V913 TA93PA026	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0044	V913 TA93PA027	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0045	V913 TA93PA028	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0047	V913 UB13PA002	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM NVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0048	V913 AB15PA001	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM SVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	
1.056259.0049	V913 AB15PA002	CENTRIFUGAL_PUMP_MC	Klaus Union	SLM SVS	ball bearing	grease	special	SKF LGHP2	10 gramm	5000	5000	

泵单机试运前检查表

The checkup table of prior to single unit trial run

位 号 Place number		检查日期 Examine date	

序号 No	排 查 项 目 Check content row	检查情况确认 Results of the review is affirmed				
		施工 Construct	设计 Design	监理 Supervis	业主 Owner	其他 Others
1	一、安装部分 First: parts of fixing					
2	1、安装找正、灌浆工作已完成并有记录 Installation and grouting has being already completed , and has note.					
3	2、设备铭牌安装完好且数据表正确无误 Equipment nameplate installation is intact completed and the datasheet is right.					
4	3、所有螺栓、螺母紧固牢靠（地脚螺栓、电机、泵体等的固定螺栓等。）All bolts and the nut fastening are dependable(bolts of anchor bolt, electric motor, pump and so on).					
5	4、没有显而易见的损坏 Without the trail damaging					
6	二、电仪部分 Second: electricity instrument part					
7	1、电机有可靠的接地 The electric motor has reliable ground connection.					
8	2、电机单试完成 The electric motor tries being.					
9	三、泵部分 Third: pump part					
10	1、润滑油/脂已根据使用说明书更换，并维持在合适的水平 The lube and lube grease are changed already according to the operating instruction manual, and are maintain on right level.					
11	2、确认泵体内干净、无杂物 Make sure there be no varia within pump.					
12	3、泵体上的排尽堵头应回装并紧固 The blind plate on pumps should installed again and fastening.					
13	4、对中合格并有记录 Centring is qualified and has taking notes.					
14	5、联轴器回装完成并紧固相关的所有螺栓 The shaft coupling installed again, and all bolts be fastened tight completed.					
15	6、手动盘车应灵活 The hand movement jigger responds to agility.					
16	7、回装保护罩 Protect cover has installed again.					
17	四、管路系统 Fourth: pipeline system					

位 号 Place number		检查日期 Examine date	

序号 No	排 查 项 目 Check content row	检查情况确认 Results of the review is affirmed				
		施工 Construct	设计 Design	监理 Supervis	业主 Owner	其他 Others
18	1、试运管路应吹扫冲洗过，保持内部干净 Try transporting a pipeline should have been swept irrigation , keep the inside clean.					
19	2、试运容器应清扫，保证干净 The trial run container has cleaned , guarantee clean.					
20	3、试运管路支架应正确、牢靠 The trial run pipeline holder is correct and dependable.					
21	4、所有试运介质不经过但与系统相连的要加盲板或关闭阀门 Pipeline which all medium is not passed but linking up with system need to add blind plate or closes conjoint valves.					
22	5、合适的临时过滤网已加过 Had already added the right provisional fliteration net.					
23	6、已安装新的或计量过的合适的压力表 Already installed the new or have measured right piezometer.					
24	7、拆去试运管路中的流量计和孔板等精密仪表 Dismantle precision instruments such as flowmeter and pore plate in trial run pipeline.					
25	8、所有连接处的垫片、螺栓 All junctions pad and bolt.					
26	五、安全部分 Fifth: safety part					
27	1、在试车区域有合适通道 In trial run area has appropriate passage.					
28	2、试车区域应设置围栏 Trial run area should interpose enclosure.					
29						

施工单位 Construction Co.	设计单位 Design Co.	监理单位 Supervis Co.	业主 Owner	其他专业 Other specialty
质检员 Inspector:	现场代表 Site Delegate:	专业工程师 Discipline Engineer:	专业工程师 Discipline Engineer:	工艺专业: Technics specialty
技术负责人 Technical Chief:				电气、仪表专业: Electricity , instrument specialty
				其他专业: Other specialty

检查合格 Examination is qualified: "✓" 未做、不合格，需返工 Not compose, Unqualified or need doing again : "×" 无该项目 Not that project: "/"