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湿式烟气脱硫设备
半干式有害气体处理设备
1. **Wet Limestone-Gypsum Process**

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2. **Typical Wet Process Flow Sheet**

   - Mixing of sorbent
   - Flue gas scrubbing
   - Gypsum dewatering
   - Powdered limestone
   - Make-up water
   - Effluent from ID fan

3. **Gypsum Plant Location**

   - City water
   - Water storage tank
   - Water transfer pump
   - Wet ESP washing pump
   - Oxidizer

4. **Semi-Fluid Process**

   - Oxidation air blower
   - Absorber blowers
   - Mg(CH)₂ feed pump
   - From tank lorry
   - Circulating water
   - Gypsum

5. **Bleed off Pump**

   - Absorber recirculation pump
   - Oxidation air blower

6. **Circulation Pump**

   - Absorber pump
   - Oxidizer pump
   - Conc. ammonia supply pump

7. **Mist Eliminator**

   - Wash pump
   - City water
   - Water storage tank

8. **Wet EP Cleaning**

   - Washing pump
   - Oxidizer

9. **Towts**

   - Supply pump
   - Ammonia waste water storage tank

10. **TR B**

    - Supply pump
    - Ammonia waste water storage tank

11. **A**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

12. **Absorber**

    - Recirculation pump
    - Oxidation air blower

13. **Mg(CH)₂ Storage Tank**

    - Absorber blower
    - Mg(CH)₂ feed pump

14. **From EP Booster Fan**

    - Ammonia waste water storage tank
    - Ammonia water supply pump

15. **B-Pumps**

    - Bleed off pump
    - Absorber recirculation pump

16. **C-Marks**

    - Oxidizer
    - Conc. ammonia supply pump

17. **M-Marks**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

18. **Absorber Blower**

    - Mg(CH)₂ feed pump
    - From tank lorry

19. **Oxidation Air Blower**

    - Absorber pump
    - Oxidizer pump

20. **Circulation Pump**

    - Absorber pump
    - Oxidizer pump

21. **Mist Eliminator**

    - Wash pump
    - City water
    - Water storage tank

22. **Wet EP Cleaning**

    - Washing pump
    - Oxidizer

23. **Towts**

    - Supply pump
    - Ammonia waste water storage tank

24. **TR B**

    - Supply pump
    - Ammonia waste water storage tank

25. **A**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

26. **Absorber**

    - Recirculation pump
    - Oxidation air blower

27. **Mg(CH)₂ Storage Tank**

    - Absorber blower
    - Mg(CH)₂ feed pump

28. **From EP Booster Fan**

    - Ammonia waste water storage tank
    - Ammonia water supply pump

29. **B-Pumps**

    - Bleed off pump
    - Absorber recirculation pump

30. **C-Marks**

    - Oxidizer
    - Conc. ammonia supply pump

31. **M-Marks**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

32. **Absorber Blower**

    - Mg(CH)₂ feed pump
    - From tank lorry

33. **Oxidation Air Blower**

    - Absorber pump
    - Oxidizer pump

34. **Circulation Pump**

    - Absorber pump
    - Oxidizer pump

35. **Mist Eliminator**

    - Wash pump
    - City water
    - Water storage tank

36. **Wet EP Cleaning**

    - Washing pump
    - Oxidizer

37. **Towts**

    - Supply pump
    - Ammonia waste water storage tank

38. **TR B**

    - Supply pump
    - Ammonia waste water storage tank

39. **A**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

40. **Absorber**

    - Recirculation pump
    - Oxidation air blower

41. **Mg(CH)₂ Storage Tank**

    - Absorber blower
    - Mg(CH)₂ feed pump

42. **From EP Booster Fan**

    - Ammonia waste water storage tank
    - Ammonia water supply pump

43. **B-Pumps**

    - Bleed off pump
    - Absorber recirculation pump

44. **C-Marks**

    - Oxidizer
    - Conc. ammonia supply pump

45. **M-Marks**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

46. **Absorber Blower**

    - Mg(CH)₂ feed pump
    - From tank lorry

47. **Oxidation Air Blower**

    - Absorber pump
    - Oxidizer pump

48. **Circulation Pump**

    - Absorber pump
    - Oxidizer pump

49. **Mist Eliminator**

    - Wash pump
    - City water
    - Water storage tank

50. **Wet EP Cleaning**

    - Washing pump
    - Oxidizer

51. **Towts**

    - Supply pump
    - Ammonia waste water storage tank

52. **TR B**

    - Supply pump
    - Ammonia waste water storage tank

53. **A**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

54. **Absorber**

    - Recirculation pump
    - Oxidation air blower

55. **Mg(CH)₂ Storage Tank**

    - Absorber blower
    - Mg(CH)₂ feed pump

56. **From EP Booster Fan**

    - Ammonia waste water storage tank
    - Ammonia water supply pump

57. **B-Pumps**

    - Bleed off pump
    - Absorber recirculation pump

58. **C-Marks**

    - Oxidizer
    - Conc. ammonia supply pump

59. **M-Marks**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

60. **Absorber Blower**

    - Mg(CH)₂ feed pump
    - From tank lorry

61. **Oxidation Air Blower**

    - Absorber pump
    - Oxidizer pump

62. **Circulation Pump**

    - Absorber pump
    - Oxidizer pump

63. **Mist Eliminator**

    - Wash pump
    - City water
    - Water storage tank

64. **Wet EP Cleaning**

    - Washing pump
    - Oxidizer

65. **Towts**

    - Supply pump
    - Ammonia waste water storage tank

66. **TR B**

    - Supply pump
    - Ammonia waste water storage tank

67. **A**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

68. **Absorber**

    - Recirculation pump
    - Oxidation air blower

69. **Mg(CH)₂ Storage Tank**

    - Absorber blower
    - Mg(CH)₂ feed pump

70. **From EP Booster Fan**

    - Ammonia waste water storage tank
    - Ammonia water supply pump

71. **B-Pumps**

    - Bleed off pump
    - Absorber recirculation pump

72. **C-Marks**

    - Oxidizer
    - Conc. ammonia supply pump

73. **M-Marks**

    - Conc. ammonia storage tank
    - Conc. ammonia supply pump

74. **Absorber Blower**

    - Mg(CH)₂ feed pump
    - From tank lorry

75. **Oxidation Air Blower**

    - Absorber pump
    - Oxidizer pump

76. **Circulation Pump**

    - Absorber pump
    - Oxidizer pump

77. **Mist Eliminator**

    - Wash pump
    - City water
    - Water storage tank

78. **Wet EP Cleaning**

    - Washing pump
    - Oxidizer


### 湿式烟气脱硫设备

#### 1. 湿式烟气脱硫

- **工法**
  - 采用石灰石-石膏法
  - 三相喷淋吸收
- **特点**
  - 物质循环利用，降低运行成本
  - 可持续发展经济性

- **工艺流程**
  - 烟气进入吸收塔
  - 吸收塔内循环浆液
  - 吸收热反应
  - 烟气排放

### 半干式有害气体处理设备

#### 2. 半干式脱硫

- **工法**
  - 采用干石灰或石灰石
  - 多级接触
- **特点**
  - 降低运行成本
  - 提高脱硫效率

- **工艺流程**
  - 烟气进入反应器
  - 添加干石灰
  - 反应生成石膏
  - 烟气排放
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