

# Prework Worksheet

Please complete before arriving

This is for your own personal knowledge only

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1. How many unique sand systems does your foundry operate?  

2. Complete the sections below for each sand system

**Sand system name:** \_\_\_\_\_

3. Bring a Map your green sand system

Include: Silos, mullers/mixers, belts, cooling lines, sand coolers, test points, dust collection

## **A. Sand Storage:**

4. How many sand silos do you have?

5. What is their individual capacity?

6. What is the total sand holding capacity?

7. Where are they located relative to the sand system? Do they have any anti-segregation?

## **B. Sand Preparation:**

8. Do you have a sand cooler? What type (fluidized bed, multicooler, etc.)?

9. What is the temperature entering and exiting the cooler?

10. What is the moisture entering and exiting the cooler?

11. Does this change seasonally? By how much?

12. How long between your cooler to your muller? Time and distance?

## **C. Additions**

*New Sand:*

13. What type of new sand(s) do you purchase?

14. Bring a cert if possible. (Mineral (silica/lake etc.), Fineness, Distribution, ADV, pH)

15. Where do you add new sand to the system? Do you add it to the muller?

16. How is the new sand addition controlled? How to do you determine how much to add?
17. What is your typical new sand addition rate? How many pounds per ton of metal poured?

**Core Sand:**

18. What type of core sand(s) do you purchase?
19. *Bring a cert if possible. (Mineral (silica/lake etc.), Fineness, Distribution, ADV)*
20. What core binder system(s) do you use?
21. How much core sand is added to the system weekly/monthly?
22. What is your approximate core sand addition per ton of iron poured?
23. Is your addition high on certain days? What is the daily variation of core sand addition?
24. Do you purchase any cores? Bring a cert if possible.

**Clay / Premix:**

25. Do you add a premix or individual ingredients?
26. What is your premix or individual addition mix? (% Western, % Southern, % Seacoal, etc.)
27. Where do you add your clay/premix?
28. How is the clay/premix addition controlled? How do you determine how much to add?
29. What is the typical clay/premix addition?
30. On average, how much clay do you add per ton of metal poured?

***Water:***

- 31. What is your water source? (City, well, river, etc.)
- 32. Where are all the locations water is added to the system?
- 33. How do you determine how much water to add at the different locations?
- 34. What is your typical water addition to the muller?

***Metal:***

- 35. What metals do you pour?
- 36. What is the typical tons poured per day?
- 37. What is the typical pour weight of a mold?

**D. Mulling / Mixing**

- 38. Do you mull or mix your sand?
- 39. Is it batch or continuous? Do you know the manufacturer and model? Or the size?
- 40. Ask maintenance for the PM list on the Muller/Mixer. Include frequency.  
(cleaning, wheel alignment, plow alignment, scale verification, wheel wear, etc.)
- 41. Define your mull cycle (Water add, sand add, bond add, mix time, discharge time)
- 42. How many batches per day? How many tons per day are prepared? What is your typical batch size?
- 43. How long does it take to turn over the sand system?
- 44. What is the average temperature of the sand going into the muller/mixer? High/low in a week?

## **E. Testing**

### ***Sand Controller:***

45. Does your system use a compactability controller? Who manufactured it?

46. What parameters does it measure?

47. What inputs is it allowed to control?

**48. Bring a digital version of one shift of data.**

49. Do you have Temperature compensation control (TCC) enabled?

50. How long from the muller discharge to molding in time and distance?

51. What is the typical incoming temp, moisture and conductivity

52. Does this vary day to day / season to season?

53. Do you track your % +/- 1 or +/- 3 compactability target met? If so, what is a target %?

### ***Sand Operator:***

54. What test(s) does your Muller Operator run?

55. Are any of these test results used to control Muller addition amounts? If yes, how are they used?

### ***Lab Testing:***

**56. Bring a recent week of lab test data and targets.**

**57. Bring a digital copy of your internal sand testing for the past month**

**58. Bring a copy of any outside lab testing of the sand.**

Key Tests: Temperature, moisture, compactability, specimen weight, perm, green strength, dry strength, MB Clay, AFS Clay, GFN, AFS Clay, LOI, Screen Distribution, pH, ADV, Wet Tensile, Volatiles, Sulfur

59. What is your frequency of testing?

## **F. Molding**

- 60. What molding machine(s) use this sand system?
- 61. Flask or flaskless?
- 62. Vertical or horizontal?
- 63. What is your typical squeeze pressure? Do you have zones?
- 64. What is your molds per hour
- 65. What is your flask size?
- 66. How many pounds of sand per mold?
- 67. Do you measure mold hardness? How often?
- 68. Do you use any mold coatings? Cope Rope/Seal?

## **G. Pouring & Cooling**

- 69. What is your Average Sand: Metal Ratio?
- 70. How long do castings sit in the mold before shakeout? Min/Max/Weekend?

## **H. Shakeout**

- 71. What shakeout system do you use?
- 72. How is sand discharged from the system? How much is discharged per day?
- 73. How do you determine how much sand is discharged?
- 74. How many different dust collection systems affect the sand system?
- 75. Do you measure the properties of the dust? Frequency? What tests?
- 76. Bring long term results and ranges
- 77. Do you run any reclamation? If so, what kind? How is this added into the sand system?

## **I. Scrap**

- 78. What is your number one sand related defect?
- 79. Bring an example and data surrounding it.