Green Sand System Control Points
listed by variation indicator in two left columns & possible causes for variation in two right columns

Green Sand Physical Property Variation	Molding Condition Variations (cont.)	Possible Causes for Variations	Possible Causes for Variations
Increased Moisture 1-5-6-8-16-50-51	Hot Sand 30-31-5-6-4-32-20-16-39	1. return sand temperature increasing	33. pattern problems: loose/unevenly mounted
Decreased Moisture 2-5-6-7-15-51	Short Sand Volume 13-1-7-10-11-20-52-53-21-30	2. return sand temperature decreasing	34. pattern/mold strip problems
Increased Compactability 13-12-11-3-10-1-2-51		3. mull time or mixer retention time increasing	35. oversize cores/incorrectly set cores
Decreased Compactability 14-11-12-4-9-2-1-50-51	**Casting Defects**	4. mull time or mixer retention time decreasing	36. decreasing squeeze, ram or impact pressure
Increased Green Compression Strength 3-14-13-2-1-22-10-41	Shift 41-33-34	5. temperature probe: failure, dirty or incorrectly set	37. increasing squeeze, ram or impact pressure
Decreased Green Compression Strength 4-13-14-1-2-9-50-51	Ram Away 33-34-5-6-7-1-3-13-12-11	6. moisture probe: failure, dirty or incorrectly set	38. uneven bottom boards, pallet tops or car tops
Increased Permeability 27-22-24-14	Burn-On 13-5-6-12-28-26-36-19-18-6-55-45-58-59-60	7. compactability increasing	39. build-up on hopper sides
Decreased Permeability 28-21-23-13-17	Burn-In 13-5-6-12-27-26-36-19-18-55-57-45-48-58-59-60-61	8. compactability decreasing	40. inadequate hopper ventilation/air movement
Increased M.B. Clay % 20-25-10	Blows 13-5-6-11-12-43-42-1-30-10-4-23-28-21-47-37-25-18-61-58-37	9. muller/mixer batch size/through put increasing	41. pin/bushing, cope/drag registration
Decreased M.B. Clay % 20-26-9	Scabs 13-5-6-1-4-10-58-37-14-56-43-42-59-60-18-24-25-26-63-59	10. muller/mixer batch size/through put decreasing	42. pattern spray equipment problems
Increased Combustibles 20-18-19-17-10	Sand inclusions 13-5-6-1-4-2-3-12-60-18-19-17-25-26-21-2-30-43-44-42-36	11. M.B. Clay increasing	43. excessive pattern spray
Decreased Combustibles 20-18-19-9	Cracked Castings 15-1-5-6-10-4-10-33-34-37-53-62	12. M.B. Clay decreasing	44. insufficient pattern spray
Increased Dry Compression Strength 13-11-12-3-10-18	Crushes 16-5-6-4-5-10-9-12-11-41-34-33-35-37	13. prepared sand moisture increasing	45. mold spray equipment problems
Decreased Dry Compression Strength 14-12-11-4-9-18-50	Drops 15 and 12-14 and 11-1-2-3-4-9-10-21-23-24	14. prepared sand moisture decreasing	46. mold spray viscosity or Baume'
Increased A.F.S. Clay 21-25-17-28-11	Porosity 61-13-5-6-10-1-4-21-23-25-28-11-43-42-55-56-19-37-59-62	15. return sand moisture increasing	47. mold system dust collection decreasing
Decreased A.F.S. Clay 22-26-27-12	Hot Tears 13-1-5-6-10-12-18-37-59-60-62	16. return sand moisture decreasing	48. mold system dust collection increasing
Finer Screen Distribution 47-23-38	Warped 16-5-6-4-11-36-37-58	17. sand contamination	49. muller wheel/plow setting or wear
Coarser Screen Distribution 48-24-27-19	Veining 26-29-22-18-13-5-6-1-61-63-37-59	18. wrong rebonding material	50. muller r.p.m.
Increased prepared Sand Temp 30-20-16-31-32-4-5-6-9	Rat Tails 26-29-22-18-12-5-6-1-61-17-37-59	19. excessive core breakdown in green sand system	51. muller sequencing/timing
	Shrink 63-36-1-5-6-3-26-62-60-59-29-18	20. change in sand/metal ratio	52. insufficient prepared sand in flask prior to squeeze, ram or impact
Molding Condition Variations	Buckles 26-13-1-5-6-10-14-12-33-34-35-61-63-37-58-59	21. excessive fines	53. shakeout equipment operation
Cracked Molds 33-34-35-38-11-20	Erosion Scabs 13-1-5-6-4-36-55-56-46-23-21-59-25-26-29-18	22. insufficient fines	54. incorrectly set sand drop into flask
Ram Away 33-34-5-6-7-1-3-13-12-11	Swells 36-13-1-5-6-4-63-12-26-29-24-18-58-37	23. insufficient new sand additions	55. wet mold spray
Soft Molds 36-13-5-6-3-1-10	Pin Holes 61-13-5-6-10-1-4-21-23-35-28-11-43-42-55-56-19-37-59-62	24. excessive new sand additions	56. excessive mold spray
Push-Ups 33-34-38-35-12-4-1-10	Penetration 61-59-12-1-5-6-4-10-12-21-27-20-36-23	25. excessive rebonding material, combustible material	58. uneven mold hardness
Sagging 33-34-12-1-4-2-7-10-52		26. insufficient rebonding material, combustible material	58. uneven mold hardness
Slickers 1-13-15-12-5-6-4-10-42-44-43-42-33-34-9-11-9-3		27. base sand coarser	59. excessive metal temperature/ferrostatic pressure
Friable Edges 1-4-5-6-11-9-8-14-25-36-43		28. base sand finer	60. gating problems (too sensitive to process variations)
Sand Sticking in Hoppers 1-12-15-40-41-11-26-25-20		29. rebonding material loss in dust collection system	61. mold venting problems (too sensitive to process variations) or not enough vents
Run Outs 34-41-33-35-36-13-1-3-5-6		30. sand cooling system not operating correctly	62. metal chemistry problems
Shake Out Problems 53-13-5-6-1-11-23-18-3-10-20-25		31. muller exhaust system operation	63. mold wall movement
Loosing Sand at Shakeout 53-13-12-5-6-18-23		32. low sand volume in entire system	64. flask problems/build up

For the A.F.S. 4-M Green Sand Molding Committee by Tom Sink
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