# RAPID CONDITIONING 102
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## Abstract

This paper covers the latest information on the developments and usage of rapid conditioning equipment in fiber testing laboratories in Australia and the USA.

## Discussion

Figure 1 defines RapidCon 101, wherein well-conditioned laboratory air is drawn through perforated-bottom trays containing cotton samples, such as 24 HVI classing samples. This technology was developed by USDA/Agricultural Marketing Service and enabled dramatic reductions in moisture content equilibration times, from days to minutes. The suction plena are integrated into sample transport conveyors, and the system works satisfactorily for large classing offices with numerous HVIs, for cottons which are not too high or low in moisture content, and for most varieties.

Thorough investigations by Cotton Inc., Queensland Cotton Pty, Australia, and Schaffner Technologies into this prerequisite technology generally confirmed the AMS results but, significantly, extended applicability to smaller labs and enabled several improvements in performance. Figure 2 defines RapidCon 102, wherein two of the primary extensions are seen: (1) Sample Conditioning Chamber and (2) Laboratory Conditioning Loop.

Figure 3 demonstrates the uniformity in sample moisture content readings MC achievable in the typical 14 minute rapid conditioning cycle. Part A represents our general experience. Part B was a special trial for which MC > 8% was desired by the Customer, as was use of his existing wall AC unit. Note the better precision in MC in this specific test.

Figure 4 demonstrates the rapid transient response in and stability of Lab RH readings and approximately 2°F of evaporative cooling.

The apparatus described schematically in Figure 2 is trade-marked "RapidAir™" and there are several patents and patents pending on the subject matter.
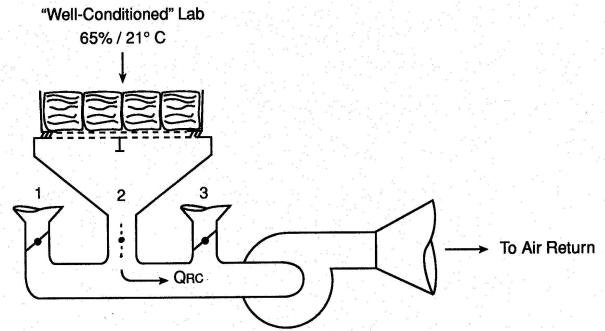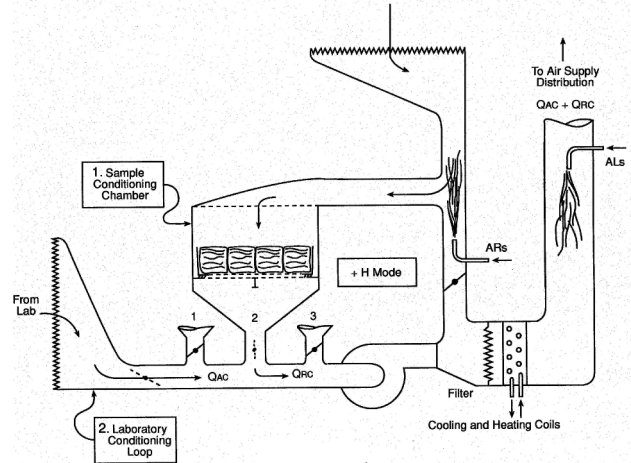


Figure 1



Figure 2

### RapidAir 1-50 SAMPLE MOISTURE CONTENT

A. At Standard Conditions HR = 65 ± 2%, TR = 70 ± 1°F: $\overline{MC}$/sd = 7.3%/0.5% in typical 14 minute RC Cycle.

B. Special Customer Trial Objective: $\overline{MC} \to \gtrsim$ 8% + Wall AC

| Time Minutes | Moisture Content MC, % Mid-Depth at all 4 Positions. | | | | $\overline{MC}$/sd %/% |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | |
| 0 Begin Cycle | 5.8 | 5.7 | 5.8 | 5.5 | 5.7/0.1 |
| 5 End T1 | 9.5 | 9.0 | 8.8 | 8.8 | 9.0/0.3 |
| 14 End T2 | 8.5 | 8.5 | 8.4 | 8.5 | 8.5/0.1 |
| 74 T3 = 60 | 8.5 | 8.4 | 8.7 | 8.3 | 8.5/0.2 |

(left margin: Typical + H RC Cycle)

HL = 64.7%/1.0% (RA Lab Conditioning)
HR = 66.2%/0.1% (During T2 and T3)

TL = 77.2°F/0.8°F
TR = 77.4°F/2.1°F

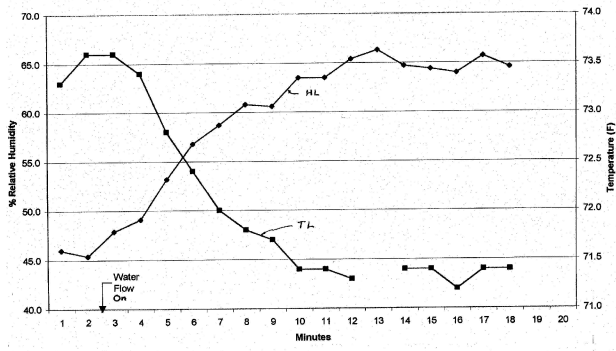TL & TR ≠ 70° due to inadequate wall AC Unit

Figure 3

Figure 4