

## Burns from a plaster backslab: Is current practice safe?

\* Plaster sets by an exothermic reaction and can reach temperatures up to 82.2°C

\* Full thickness burns can occur if 50°C is sustained for 5-10 minutes

\* **Method:** simulation limb, temperature probe, plaster + padding. Temperature measured at 5 minute intervals. Five tests for each variable, mean result recorded.

\* Contributing factors in literature (variables tested)

- \* Dipping water temperature (20/40/60°C)
- \* Thickness of plaster (8/12/16 layers)
- \* Padding (1/2/3 layers)
- \* Inadequate ventilation (blankets/no blanket)

\* Temperature peak at 20mins in most cases

\* **Results:** highest plaster temp with higher water temp and thicker plaster

- \* Ventilation - small increase with decreased ventilation
- \* Padding - no difference

\* Only hot dipping water increased temp >50°C

\* Simulation limb - lower starting temp -> lower temperature overall

\* **Safest practice:** *minimum thickness* of plaster for required strength, *cool dipping water* ( $\leq 20^{\circ}\text{C}$ ), *adequate ventilation* until set, padding for comfort

### Water temperature

#### Water temp 20°C

plaster	1m	5m	10m	15m	20m	25m	30m	35m
16 layers	21.8	21.4	25.0	32.2	36.5	32.4	30.2	29.6
12 layers	20.2	21.6	25.4	27.7	31.5	30.9	28.5	26.2
8 layers	21.6	21.6	23.2	29.1	31.2	28.8	25.8	23.4

#### Water temp 40°C

plaster	1m	5m	10m	15m	20m	25m	30m	35m
16 layers	34.9	36.8	41.4	44.5	39.8	35.4	31.8	28.4
12 layers	35.5	35.7	39.3	41.2	36.8	32.5	29.1	27.2
8 layers	36.0	33.7	35.9	36.4	33.4	29.5	27.0	25.0

#### Water temp 60°C

plaster	1m	5m	10m	15m	20m	25m	30m	35m
16 layers	52.0	47.0	43.0	43.7	41.0	35.5	33.9	31.5
12 layers	50.4	40.6	39.1	41.6	40.0	35.8	32.2	30.9
8 layers	46.8	37.4	37.8	37.7	36.5	31.7	29.4	27.7

### Ventilation

#### Water temp 20°C - covered with 2 layers of blankets-1

plaster	1m	5m	10m	15m	20m	25m	30m	35m
16 layers	20.6	23.5	27.4	34.2	37.8	33.6	31.9	30.2
12 layers	20.4	22.2	26.9	28.3	32.3	30.9	29.1	27.6
8 layers	20.5	21.1	23.2	29.4	31.8	29.6	26.3	24.7

#### Water temp 20°C - no blankets

plaster	1m	5m	10m	15m	20m	25m	30m	35m
16 layers	21.8	21.4	25.0	32.2	36.5	32.4	30.2	29.6
12 layers	20.2	21.6	25.4	27.7	31.5	30.9	28.5	26.2
8 layers	21.6	21.6	23.2	29.1	31.2	28.8	25.8	23.4

### Layers of padding

#### Water temp 20°C - 16 layers of plaster

padding	1m	5m	10m	15m	20m	25m	30m	35m
3 layers	21.8	21.4	25.0	32.2	36.5	32.4	30.2	29.6
2 layers	22.7	22.6	28.1	36.9	37.1	33.2	29.4	27.3
1 layer	20.7	20.9	25.0	32.8	34.5	32.8	29.9	27.7

#### Water temp 20°C - 12 layers of plaster

padding	1m	5m	10m	15m	20m	25m	30m	35m
3 layers	20.2	21.6	25.4	27.7	31.5	30.9	28.5	26.2
2 layers	19.6	20.2	23.9	30.2	32.0	30.5	27.4	25.3
1 layer	21.2	20.8	24.4	30.5	31.7	30.2	27.6	25.7

#### Water temp 20°C - 8 layers of plaster

padding	1m	5m	10m	15m	20m	25m	30m	35m
3 layers	21.6	21.6	23.2	29.1	31.2	28.8	25.8	23.4
2 layers	21.8	21.4	23.8	30.0	31.4	29.1	26.0	23.2
1 layer	20.6	20.7	22.9	25.5	29.0	27.5	24.9	22.6

