



HTM02-01 Design Consulting Specialist in HTM02-01 Design.

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Whitepaper: Engineering Safety and Compliance in MGPS Design

Reducing Risk and Ensuring Audit-Ready Traceability with MediPress Pro V3

Executive Summary

The design of Medical Gas Pipeline Systems (MGPS) under modern standards is a life-critical engineering task. Traditional design methods often rely on opaque spreadsheets or "black box" software that provide results without showing the underlying mathematical journey. This whitepaper explores the critical importance of full calculation traceability in MGPS design and how MediPress Pro V3—a proprietary internal design tool—provides the transparency required to ensure patient safety and regulatory compliance.

1. The Compliance Challenge: SHTM & HTM 02-01 Complexity

Current standards (Part A) mandate strict pressure loss limits to ensure that terminal units deliver gases at correct clinical pressures.

- **Diverse System Limits:** Design compliance requires managing varying limits, such as the 20 kPa maximum loss for 400 kPa systems and the 34 kPa limit for 700 kPa Surgical Air (SA7) systems.
- **The "Black Box" Risk:** Providing final pressure figures without intermediate steps makes it nearly impossible to retrospectively find where a diversity factor or sizing error occurred if a system fails commissioning.
- **The Informed Design Process (IDP):** The new Scottish SHTM 02-01 methodology moves away from prescriptive formulas toward a risk-based approach centered on clinical needs, operational risks, and future resilience.

2. MediPress Pro V3: A New Standard in Traceability

Developed to bridge the gap between complex engineering and transparent documentation, MediPress Pro V3 provides a fully traceable calculation string for every section of the pipeline⁸.

- **Automatic Fitting Allowance (Appendix G.14 / G13):** To mitigate the risk of underestimating resistance, the software automatically adds 25% to the actual measured pipe length to account for the pressure loss of fittings, valves, and bends.
- **Department-Specific Analysis (Delivery Units):** Recognizing that modern hospitals are modular, the tool evaluates each department (Delivery Unit) independently against full system limits.
- **Automated "Path Completion":** The software features a unique tool that automatically traces the flow from any clinical outlet back to the source, ensuring accurate flow accumulation as pipes move toward the plant room.
- **Standardized Table Integration:** All calculations are built upon the rigorous data from HTM 02-01 Tables A2 through A5, covering pipework from 12mm to 108mm.



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3. The Professional Engineering Bridge: Beyond the Spreadsheet

MediPress Pro V3 formalises the "expert-in-the-loop" methodology, moving beyond the inherent risks of manual Excel "copy-paste" workflows.

- **Human-Centered Clinical Input:** The software mandates manual "Design Flow" entry. This forces the designer to perform the required research into patient cohorts and clinical procedures (e.g., pandemic surge capacity) before calculation.
- **Digital Governance:** By replacing manual cell linking with dynamic path tracing, the software eliminates "finger-trouble" errors while maintaining the "Claims, Argument, Evidence" basis required for a Well Reasoned Argument (WRA).
- **Risk-Based Alerts:** A built-in "Section Warning" triggers if a single section represents more than 5% of the total system loss, identifying technical bottlenecks early in the design phase.

4. Proprietary Internal Governance

MediPress Pro V3 is a strictly proprietary internal design tool developed for exclusive use by our engineering team.

- **Expert Oversight:** This exclusivity ensures the tool is never used by unqualified parties, maintaining the professional oversight required by SHTM 02-01 Design Groups.
- **Accountability:** The tool requires the designation of an "Authorised Person MGPS," linking the technical output directly to professional accountability and project governance.

5. Summary of Compliance Alignment

Feature	IDP / SHTM 02-01 Philosophy	Status
Section Warning Alert	Risk-based approach to safety	Compliant
Department Limits	Clinical needs & tailored design	Compliant
Manual Flow Entry	Research & Investigation	Compliant
HTM Table Integration	Underlying technical framework	Compliant
Authorised Person Field	Multidisciplinary decision-making	Supports

Conclusion: Engineering Peace of Mind

In the healthcare sector, "good enough" is not an option for life-support systems. By utilising MediPress Pro V3 as our internal design standard, we provide more than just a layout; we provide a verified safety record. We eliminate guesswork for Authorising Engineers and provide Estate Managers with the confidence that their MGPS infrastructure is robust, compliant, and—above all—safe for patient care.