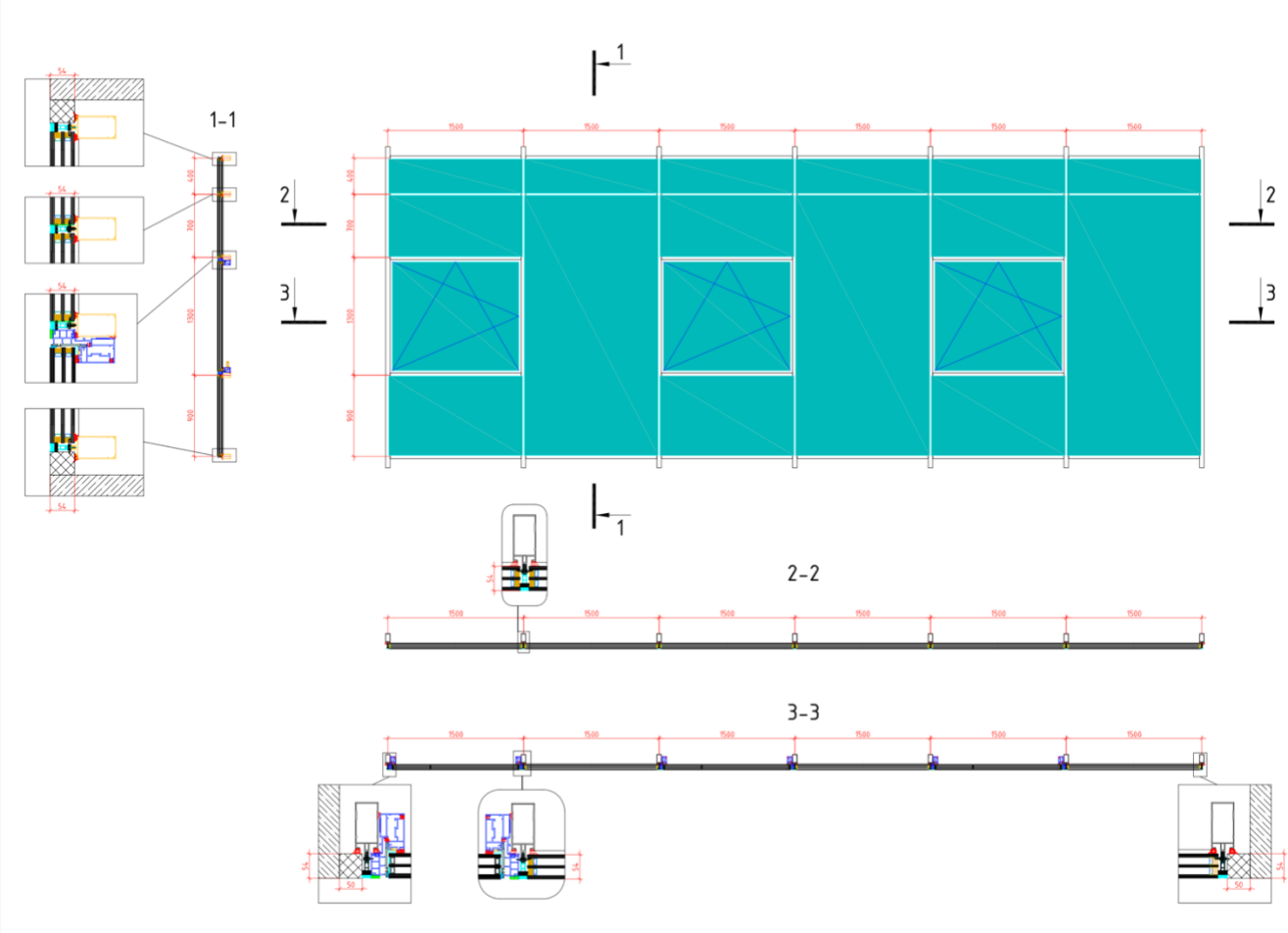
Facade Systems Comparison:

Classic vs. MIODIO Glas

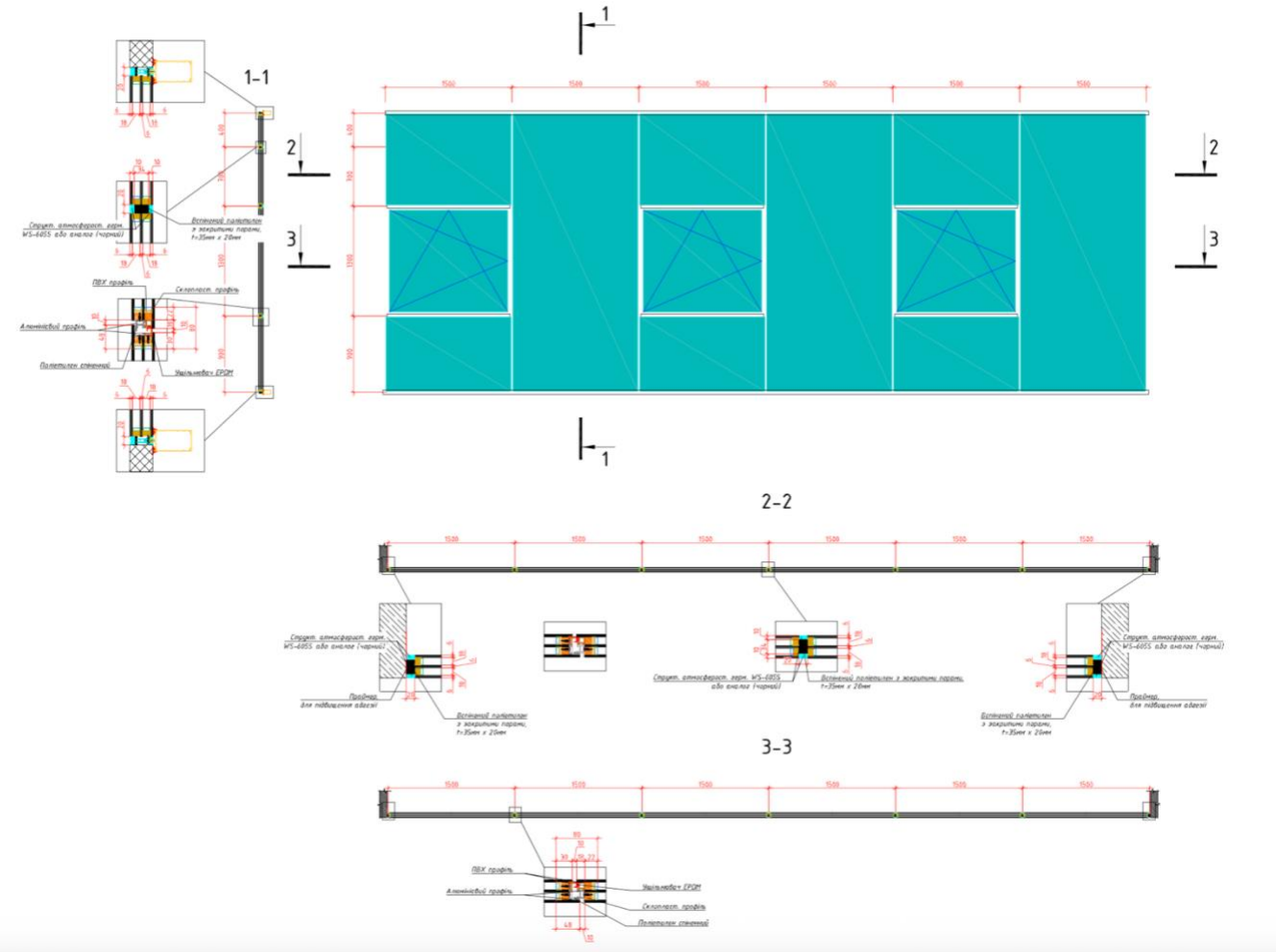
Subject of Analysis: This report provides a comprehensive technical, material, and environmental comparison between a standard aluminum curtain wall system and the innovative MIODIO Glas structural glazing technology. The analysis focuses on material efficiency, weight reduction, and carbon footprint optimization.



1. Classic Aluminum System Specification

Mullion & Transom: HI 86 Series (125mm depth Mullion / 65mm depth Transom)
Opening Configuration: Reynaers MasterLine 8 (Turn-Tilt Sashes)

Material Item	Unit	Project Scope (Net)
Mullion (125 mm depth)	l.m.	24.5
Transom (65 mm depth)	l.m.	43.5
Pressure plate + Decorative cover cap	l.m.	136.0
Thermal break (polyamide insert)	l.m.	68.0
Window frame & sash (Reynaers)	l.m.	34.2
Facade screws (stainless steel)	pcs	315
EPDM gaskets (all contours)	l.m.	~300.0
Total aluminum weight (net)	**kg**	**234.0**
Painting area (net)	**sq.m.**	**26.7**



2. MIODIO Glas System Specification

Core Technology: MIODIO Glas featuring BONDGLAZE structural bonding
Opening Configuration: Reynaers Integrated Sashes via MIODIO Profiles

Material Item	Unit	Project Scope (Net)
Transom (65 mm depth)	l.m.	18.0
MIODIO bonding profile	l.m.	18.0

Material Item	Unit	Project Scope (Net)
Window sash (Reynaers)	l.m.	16.8
PE foam cord + PVC profile	l.m.	45.0
Structural sealant WS-6055	l.m.	45.0
Total aluminum weight (net)	**kg**	**79.9**
Painting area (net)	**sq.m.**	**9.2**

3. Comprehensive Material & Environmental Comparison

Material / Metric	Unit	Classic System	MIODIO Glas System	Difference (Savings)
Total aluminum weight (net)	kg	234.0	79.9	**-154.1**
Painting area (net)	sq.m.	26.7	9.2	**-17.5**
Thermal breaks & EPDM rubber	kg	~45.0	0.0	**-45.0**
Facade screws (stainless)	pcs	315	0	**-315**

Material / Metric	Unit	Classic System	MIODIO Glas System	Difference (Savings)
Structural sealant & PE cord	kg	0.0	~4.0	**+4.0**
Total System Carbon Footprint (Full LCA Estimate)	**kg CO2e**	**~2256.8**	**~734.7**	**-1522.1**

4. Carbon Footprint Calculation Methodology (LCA Estimate)

The Global Warming Potential (GWP) is calculated in kg of CO2 equivalent (kg CO2e) based on standard European Life Cycle Assessment (LCA) practices for building materials. The total system footprint is the sum of the emissions from aluminum production, powder coating, rubber/plastic components, and sealants. Below is the breakdown of the applied emission factors:

- **Extruded Aluminum:** Calculated using the European Aluminium Association (EAA) standard emission factor. The baseline average for extruded profile consumption in Europe (including recycling mix and import) is **8.6 kg CO2e per 1 kg of aluminum**.
  Calculation: Classic (234 kg × 8.6 = 2012.4 kg CO2e) vs. MIODIO (79.9 kg × 8.6 = 687.1 kg CO2e).
- **Powder Coating:** The surface treatment process is estimated at an average of **3.0 kg CO2e per 1 sq.m.** of painted surface.
  Calculation: Classic (26.7 m^2 × 3.0 = 80.1 kg CO2e) vs. MIODIO (9.2 m^2 × 3.0 = 27.6 kg CO2e).
- **Thermal Breaks & EPDM Rubber:** Polyamide thermal breaks and EPDM gaskets have an average carbon footprint of **3.5 kg CO2e per 1 kg of material**. In the classic system, approximately 45 kg of these components are used.
  Calculation: Classic (45 kg × 3.5 = 157.5 kg CO2e). The MIODIO system eliminates

these components entirely.

- **Stainless Steel Fasteners:** The production of stainless steel screws averages **4.5 kg CO2e per 1 kg**. The 315 screws in the classic system weigh approximately 1.5 kg. *Calculation: Classic (1.5 kg × 4.5 = ~6.8 kg CO2e)*.
- **Structural Sealants & PE Cord:** The MIODIO system utilizes structural silicone/sealants (e.g., WS-6055) and PE foam cords, which average **5.0 kg CO2e per 1 kg**. The estimated total weight for the required 45 linear meters is roughly 4 kg. *Calculation: MIODIO (4 kg × 5.0 = 20.0 kg CO2e)*.

Technical Disclaimer

For precise architectural and engineering implementation, it is mandatory to further develop and physically test all window constructions, structural nodes, and connection details. The technical designs presented in this report were developed theoretically for comparative analysis and conceptual demonstration purposes only.