INDOOR SNOW PARK & ALPINE ARENA

Technical Refrigeration & Structural Engineering Specifications

DWG NO: SNP-ENG-2026
Standards: ISO 20054 / EN 13814 / ASHRAE

1. MASTER SYSTEM DESCRIPTION

This document outlines the thermal insulation envelope, sub-zero refrigeration engineering, real-snow production systems, slope foundation design, and safety protocols for commercial indoor snow entertainment facilities.

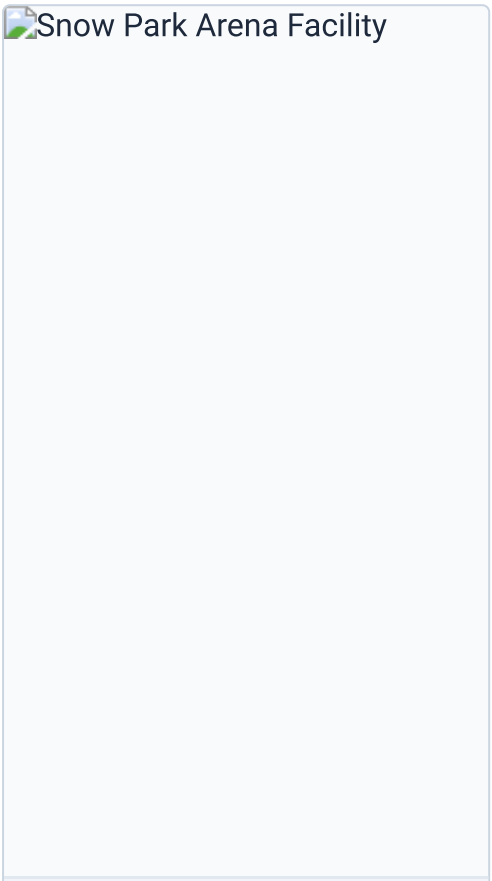


Figure 1: Indoor Snow Arena featuring Ski Slopes, Snow Play Area & Toboggan Run.

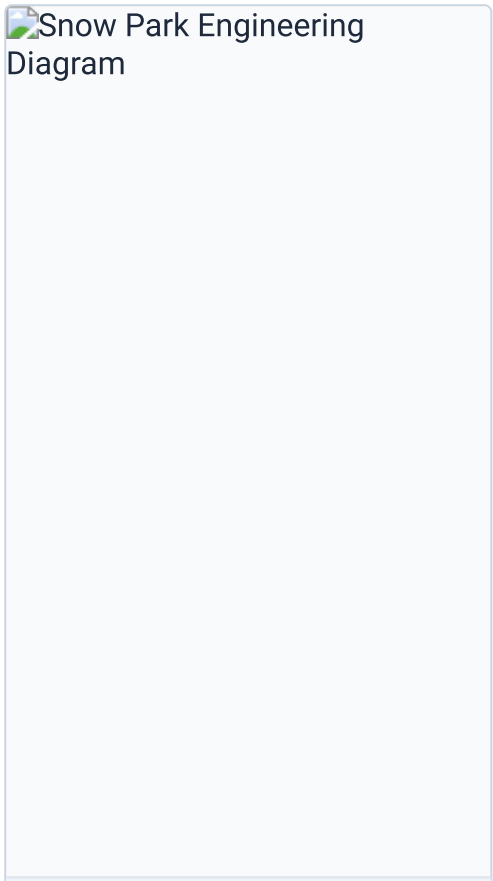


Figure 2: Technical Drawing (DWG SNP-ENG-2026) – Under-Floor Cooling & Insulation Layering.

2. TECHNICAL COMPONENT SPECIFICATIONS

System Sub-Unit	Material & Technical Specifications	Operational Parameters & Ratings
Refrigeration Plant	Ammonia (NH_3) / CO_2 cascade eco-refrigerant chilling unit with heat recovery.	Ambient operating temperature maintained at −2°C to −4°C; continuous cooling loop.
Sub-Floor Cooling System	PE-Xa cooling pipes embedded in 150mm reinforced concrete slab over PIR insulation panels.	Includes sub-soil heating system to prevent ground frost heave damage underneath.
Real Snowmakers	High-pressure water/air atomizing nozzles using purified chemical-free water.	Snow density: 300–400 kg/m³; production capacity: 50m³ per overnight cycle.
Thermal Insulation Envelope	200mm polyurethane sandwich wall/ceiling panels with vapor-tight stainless steel cladding.	Thermal conductivity U-value ≤ 0.11 W/m²K; continuous vapor barrier sealing.
Slope & Play Equipment	Tubing slide lanes, beginner ski slopes, climbing snow features, and conveyor lift.	Impact protection padding (min 100mm foam) on all structural columns and side walls.

3. SAFETY MANAGEMENT & OPERATIONAL STANDARDS

HVAC & AIR HANDLING

- **Dehumidification:** Desiccant air dryers to keep ambient humidity < 60% and prevent fog.
- **Air Circulation:** Low-velocity air distribution to prevent snow drift and temperature stratification.
- **Air Change Rate:** Minimum 2.0 fresh air changes per hour compliant with ASHRAE standards.

SAFETY & COMPLIANCE

- **Structural Design:** Rated for live snow load accumulation up to 500 kg/m² on slopes.
- **Safety Surfacing:** High-density impact barrier matting at slide termination zones.
- **Emergency Systems:** Gas leak detection sensors (NH_3/CO_2) linked to automatic extraction fans.