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TECHNICAL OVERVIEW

Tank Technical Overview Document

EVENPRODUCTS

FIRSTLY

THANK YOU

FOR CONSIDERING US!

Dear Customer,

Please find our latest technical summary for our water storage tanks. This includes specifications for all our major components including steel kits, liners and cover options.

We hope you find this a useful document and if you need any thing further please don't hesitate to get in touch.

Keith Bowden

UK Technical Sales Manager

CONTENT

SUPPORTING STEEL TANK STRUCTURE	4
.....	
GENERAL TANK SPECIFICATIONS	5
.....	
TANK COVERS (PVC, ANTI-ALGAE AND FLOATING)	6
.....	
TANK LINERS EPDM SPECIFICATION	7
.....	
SNOW & WINDSPEED LOADINGS	8
.....	
EDGE LOADING	9
.....	
.....	

SUPPORTING STEEL STRUCTURE

QUALITY

The supporting steel structure of an Evenproducts' tank system is critical to its strength and longevity. We use hot dip galvanised steel approved to British Standard EN10147:2000 and passivated for longer life and to prevent white rust problems.

We source from the best quality steel on coil, which we corrugate, punch and curve the steel sheets in house under our controlled ISO9001:2008 quality system. This quality control is important to prevent problems like white rust and rusting around the punched bolt-holes. Nuts, bolts and washers supplied with our tank systems are Sheraplex (duplex) coated for longer life.

Our tank systems are designed to provide excellent strength for the stated storage capacity, as well as the specific liner and cover which form part of each full tank system. To do this we use steel thicknesses from 0.8mm to 1.6mm and structural steel grades from S280 to S390 N/mm² (tank dependent) according to EN10142:2000

Protection of the steel against environmental attack is provided by the hot dip galvanising process to BSEN10346:2009, surface quality MA, minimised spangle. We offer our standard Z275 g/m² (137.5 g/m² per side), suitable for most applications and environments, and Z450 g/m² (225 g/m² per side) which provides enhanced protection for more aggressive environments.

Galvanising has multiple advantages:

Creates a protective barrier between the steel and aggressive rusting agents;

Provides cathodic protection for the steel;

Develops a zinc patina during natural wet/dry cycles, this provides additional protection;

Proven durability in aggressive environments;

Provides uniform protection over the entire surface.

GENERAL TANK SPECIFICATIONS

SPECIFICATIONS

STANDARD	ITEM DESCRIPTION
BS EN 10147:2000W	MANUFACTURE OF HOT DIP GALVANISED STEEL (COILED) – TANK PANELS
BS EN 10346:2009	HOT DIP GALVANISING PROCESS – TANK PANELS
SHERAPLEX COATED – REPEATABLE TORQUE TENSION CONTROL TO BS7371 PART 2 1993 SHERAPLEX COATING IS APPROVED BY W.R.C. CERTIFICATE NUMBER PT/01/0696 TO MEET THE REQUIREMENTS OF WIS 4-52-03 BS5950-5 1998 – BOLT DESIGN	NUTS, BOLTS AND WASHERS
Z275 G/M ² OR Z450 G/M ²	GALVANISATION – TANK PANELS
BS5950*	TANK STRUCTURAL CALCULATIONS
BS EN 1993 (EUROCODE)*	TANK STRUCTURAL CALCULATIONS
GSB MATERIAL LICENSE 1071 QUALICOAT P-0267 (CAT 1 CLASS 1) AAMA 2603-02 IT IS ALSO TESTED UNDER THE FOLLOWING CONDITIONS ISO2360 – FILM THICKNESS ISO2813 – GLOSS -60° ISO2409 – CROSS CUT TEST/ADHESION ISO1519 – BENDING TEST ISO2815 – IMPRESSION HARDNESS ISO1520 – CUPPING TEST ASTM D 2794 – BALL TEST ISO6270-1 – RESISTANCE TO HUMIDITY ISO9227 – SALT SPRAY TEST EN ISO 16474-3 – ACCELERATED WEATHERING EN ISO 16474-4 – ACCELERATED WEATHERING EN ISO 2810 – NATURAL WEATHERING	POWDER COATING (SMOOTH MATTE)

TANK COVERS

SPECIFICATIONS

PVC

BASE FABRIC	100% POLYESTER, 1100D.TEX 8 X 7 THREADS/CM
TOTAL WEIGHT	580G/M ² +/- 25GM ²
TENSILE STRENGTH N/50MM (AVE) DIN5334	WARP 2400 WEFT 2300
TEAR STRENGTH N (AVE) DIN53363	WARP 250 WEFT 250
COATING ADHESION EN ISO 2411	80 N/5CM
TEMPERATURE RESISTANCE	-30°/+70 °C
SPECIAL PROPERTIES	FULLY REACH COMPLIANT, ANTI UV TREATED

ANTI ALGAE

BASE FABRIC	POLYPROPYLENE TAPE FABRIC WITH HDPE MONOFILAMENT
UV STABILITY	220G/M ²
BREAKING FORCE	EN ISO10319
ELONGATION AT BREAK	EN ISO10319
CONSTRUCTION THREADS/10CM WARP/WEFT	90/68
BREAKING LOAD KN/M MD	34
BREAKING LOAD KN/M CD	30
ELONGATION % MD	25
ELONGATION % CD	15

ANTI ALGAE FLOATING COVERS

WEIGHT G/M ²	220
CONSTRUCTION THREADS/10CM WARP/WEFT	90/68
BREAKING LOAD KN/M MD	34
BREAKING LOAD KN/M CD	30
ELONGATION % MD	25
ELONGATION % CD	15
WATER PERMEABILITY L/SEC/M ²	35
UV STABILITY UK APPROX 80-90KLY/ANNUM	500

TANK LINERS

SPECIFICATIONS

EPDM

MATERIAL SPECIFICATIONS				
PHYSICAL PROPERTIES	UNIT	REQUIREMENTS	TYPICAL VALUE	TEST METHODS
HARDNESS	IRH	65+/-	65	BS 903 A26
MODULUS AT 300% ELONGATION	MPA	5,0	6,9	BS 903 A2
TENSILE STRENGTH	MPA	MIN 9,0	10,1	BS 903 A2
ELONGATION AT BREAK	%	MIN 300	405	BS903 A2
TEAR STRENGTH	KN/M	MIN 30	37	BS903 A3 C
PROPERTIES AFTER AGEING 168HR/ 121°C				BS903 A19
TENSILE STRENGTH	MPA	MIN 7.5	9.7	BS903 A2
ELONGATION AT BREAK	%	MIN 300	345	BS903 A2
BRITTLE POINT	°C	MAX -40	-53	BS903 A25

ADDITIONAL REQUIREMENTS	
APPROVALS	DIN 7864 PART. 1 1984, SWEDISH TYPE APPROVAL NO 2224/82
THICKNESS	NOMINAL +/- 10%
IDENTIFICATION	EACH ROLL MARKED WITH PRODUCT NAME, ARTICLE AND ROLL NUMBER, DIMENSIONS, DATE OF MANUFACTURE AND SIGNATURE
PACKING	POLYETHYLENE - FILM WRAPING

SNOW & WIND LOADINGS

SPECIFICATIONS

SNOW LOADING ON ROOFS

(REF US CONSTRUCTION DATA 2006)

STATED REQUIREMENT 77KG/M2

(EDGE LOADING 160KG/M2)

METRIC TABLE

DENSITY INFORMATION (SOURCED ONLINE)				
	LIGHT/DRY SNOW	HEAVY/WET SNOW	ICE	WATER
SNOW DENSITY KG/M3	50KGS (0.05/MM)	333KGS (0.33/MM)	917KGS (0.917/MM)	1000KGS (1.00/MM)
% OF WATER WEIGHT	5%	33%	92%	100%

SNOW LOAD DEPTH (MM) - WEIGHT PER SQUARE METRE (KGS)

SNOW LOADING	LIGHT/DRY SNOW KG/M2	HEAVY/WET SNOW KG/M2	ICE KG/M2	WATER KG/M2
DEPTH 50MM (2")	2.5	16.50	45.80	50.00
DEPTH 100MM (4")	5.0	33.00	91.70	100.00
DEPTH 150MM (6")	7.5	49.50	137.55	150.00
DEPTH 200MM (8")	10.00	66.00	183.40	200.00
DEPTH 250MM (10")	12.50	82.25	229.25	250.00
DEPTH 300MM (12")	15.00	99.00	275.10	300.00
DEPTH 500MM (20")	25	165.00	458.50	500.00

WINDSPEED SPECIFICATIONS

THE EVENPRODUCTS' GALVANISED STEEL TANK COVER HAS BEEN DESIGNED TO WITHSTAND A SNOW LOADING OF 0.77 KN/M2 AND TO WITHSTAND WINDSPEEDS OF UP TO 26M/S, 58MPH (IN ACCORDANCE WITH THE REQUIREMENTS OF BS6399, TANK IN EMPTY STATE). THESE CALCULATIONS ARE BASED ON THE LOADINGS TAKEN FROM BS6399-LOADING FOR BUILDINGS, AND USING THE RELEVANT LOAD FACTOR OF 1.35 FOR DEAD LOADING IN COMPLIANCE WITH THE LOAD FACTOR GUIDELINES SET OUT IN EUROCODE 0. THESE CALCULATIONS HAVE BEEN VERIFIED BY AN EXTERNAL, REPUTABLE BRITISH FIRM OF STRUCTURAL ENGINEERS. EVENPRODUCTS SOURCES ITS STEEL FROM A LEADING INDUSTRY SUPPLIER WITH WHICH IT HAS A LONG-TERM SUPPLY RELATIONSHIP, AND CURRENT TECHNICAL DATA REGARDING STEEL STRENGTH AND QUALITY IS SUPPLIED BY THEM.

SUPPORTING STEEL STRUCTURE

SPECIFICATIONS

Edge Loading Requirements

As the snow loading requirements are generally provided for use in standard building construction, the term “edge loading” appears to refer to the normal unsupported overhang of roofing materials (slates, tiles, cladding sheets etc), which overhang the structure and may be unsupported.

The reason for additional edge loading strength, appears to be required in the event of ice and icicles forming on the roof edge in extreme conditions, as the ice is heavier than snow.

The Evenproducts tank cover complies with the construction industry advised 77 kg/m² requirement over its entire surface. The cover has no exposed unsupported roof edge overhang as purlins fitted rigid box edging units extend over the tank wall, providing solid support for the small overhang. However, we do not have any loading calculations for this specific area of covers.

The Evenproducts tank cover has a roof pitch of 10° and is clad over its entire surface with smooth finish galvanised coated steel sheets. The smooth angled surface, together with the fact that generally the temperature of the stored liquid within the tank is usually higher than that of the temperature externally, which in most instances results in the resistance and build up of snow on the cover.

Evenproducts Ltd, holds UK Water Council Approval (WRAS), for its manufactured galvanised steel sectional water storage tanks and covers in the full range of sizes from 9ft (2.74m) to 48ft (14.63m) in diameter. The designs for which, have been approved to meet current loss prevention standards including wind and snow loadings, which are over and above the recommendations of Eurocode 0 (1990)

