

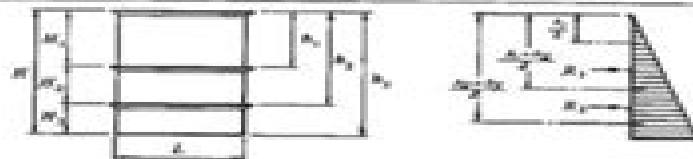
The purpose of this worksheet is to design rectangular tanks with horizontal stiffeners.  
Reference: "Pressure Vessel Handbook", 8th & 14th Editions and also  
"Roark's Formulas for Stress and Strain", 7th Edition

Job: XXXX  
Date: 05/03/2009  
By: XXX  
Description: XXX

# RECTANGULAR TANKS Under Hydrostatic Pressure WITH HORIZONTAL STIFFENINGS

## NOTATION

- $n$  = factor depending on ratio of length and height,  $H/L$ . (See Table on page 204)
- $E$  = modulus of elasticity, psi: 30,000,000 for carbon steel
- $G$  = specific gravity of liquid
- $H$  = height of tank, inches
- $I$  = moment of inertia, in.<sup>4</sup>
- $L$  = length of tank, inches
- $p$  = pressure of liquid, psi
- $R$  = reaction with subscripts indicating the location, lb./in.
- $S$  = stress value of plate, psi, as tabulated in ASME Code
- $t$  = required plate thickness, inches
- $w$  = load per unit of length lb./in.



## REQUIRED NUMBER OF STIFFENINGS

when H in inches =			
60-84	84-120	120-156	> 156
1	2	3	4

## SPACING OF STIFFENINGS

	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$
1	0.60 $H$	0.40 $H$			
2	0.45 $H$	0.30 $H$	0.25 $H$		
3	0.37 $H$	0.25 $H$	0.21 $H$	0.17 $H$	
4	0.31 $H$	0.23 $H$	0.18 $H$	0.16 $H$	0.14 $H$

## LOAD lb./in.

$$w = \frac{pSHG}{2}$$

## MINIMUM MOMENT OF INERTIA FOR STIFFENING

$$I = 1.25 R \frac{L^3}{8} \quad \text{where } R = 0.7 -$$

## REQUIRED PLATE THICKNESS

$$t = 0.37 \sqrt{\frac{0.85 p H}{S}}$$

## LEGEND

INPUT

Notes and additional actions required

Intermediate results

Results

Note to sheet user: When using Solver tool solve for the maximum stress in cell B176 equal to to the maximum allowable stress in cell B53 by changing the minimum recommended thickness in cell E126. **THIS MUST BE DONE IN ORDER TO ASSURE THE CORRECT THICKNESS IS RECOMMENDED BELOW!**

V = 134  
E = 30,000,000  
G = 1.78  
H = 72  
W = 84.5  
L = 50  
S = 16,700  
ta = 0.2500

$R^3$   
psi  
in  
in  
psi

Longest horizontal span between sufficient vertical supports, such as vertical stiffeners, stays or vessel corners.

INPUT

Minimum recommended thickness

$$t = 0.2500 \text{ in}$$

Actual thickness used including corrosion allowance, if applicable. **MAKE SURE TO CHANGE THIS TO GET PROPER STIFFENER SIZES!**

# Rectangular Tank Design With Horizontal Stiffening

**Alessandro de Iaco Veris**



## **Rectangular Tank Design With Horizontal Stiffening:**

**Engineering Applications of Composites** Bryan R. Noton, 2016-06-15 Composite Materials Volume 3 Engineering Applications of Composites covers a variety of applications of both low and high cost composite materials in a number of business sectors including material systems used in the electrical and nuclear industries The book discusses the utilization of carbon fiber reinforced plastics for a number of high volume products applications in road transportation and the application of composite materials to civil aircraft structures The text also describes the engineering considerations that enter into the selection and application of materials as well as the composite applications in existing spacecraft hardware and includes projected applications for space vehicles and systems The application of materials to military aircraft structure the components applicable to personal and mass transit vehicles and composites in the ocean engineering industry are also considered The book further tackles composite materials or composite structures principally found in buildings composite uses in the chemical industries and examples of fiber glass reinforced plastic components in key end product markets The text also looks into the most commonly employed molding techniques mechanical and physical properties of various fiber glass reinforced thermosets and thermoplastics the resins and fiber glass reinforcements available and code information The chemical physical and mechanical properties and application information about composites in the electrical and nuclear industries and the potential high volume applications of advanced composites are also encompassed Engineers and people involved in the development of composite materials will find the book invaluable **Corrosion-Resistant Plastic**

**Composites in Chemical Plant Design** Mallinson, 1987-12-18 This book covers piping buried pipe duct systems recommendations for fire safety and smoke abrasion resistance of fiberglass reinforced plastic FRP mechanism of FRP corrosion and deterioration grounding of FRP systems and popular fabrication methods of FRP **Corrosion-Resistant**

**Plastic Composites in Chemical Plant Design** John H. Mallinson, 2020-09-11 This book covers piping buried pipe duct systems recommendations for fire safety and smoke abrasion resistance of fiberglass reinforced plastic FRP mechanism of FRP corrosion and deterioration grounding of FRP systems and popular fabrication methods of FRP **Chemical Plant**

**Design with Reinforced Plastics** John H. Mallinson, 1969 Lloyd's Register Technical Association Session 1978-1979 Lloyd's Register Foundation, 1978-01-01 The Lloyd s Register Technical Association LRTA was established in 1920 with the primary objective of sharing technical expertise and knowledge within Lloyd s Register Publications have consistently been released on a yearly basis with a brief interruption between 1938 and 1946 These publications serve as a key reference point for best practices and were initially reserved for internal use to maximise LR s competitive advantage Today the LRTA takes a fresh approach focusing on collaboration by combining professional expertise from across LRF Group to ensure a frequent output of fresh perspectives and relevant content The LRTA has evolved into a Group wide initiative that identifies captures and shares knowledge spanning various business streams and functions To support this modern approach the LRTA has

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**Proceedings of the 9th International Conference on Civil Engineering** Guangliang Feng,2023-06-17 This open access book is a compilation of selected papers from the 9th International Conference on Civil Engineering ICCE2022 The work focuses on novel research findings on seismic technology of civil engineering structures High tech construction materials digitalization of civil engineering urban underground space development The contents make valuable contributions to academic researchers and engineers Pressure Vessel Handbook Eugene F. Megyesy,1995 This handbook should help to build better vessels faster and more economically As a manual for the maker and user of pressure vessels it is designed for the designer drafter inspector and estimator **Design of Process Equipment** Kanti K. Mahajan,1985 **Oxy-acetylene Tips** ,1922 *Applied Mechanics Reviews* ,1968 Oxy-acetylene Tips for the Linde Ox-welder ,1922 Reinforced Concrete Designer's Handbook Charles E. Reynolds,James C. Steedman,Anthony J. Threlfall,2007-08-07 This classic and essential work has been thoroughly revised and updated in line with the requirements of new codes and standards which have been introduced in recent years including the new Eurocode as well as up to date British Standards It provides a general introduction along with details of analysis and design of a wide range of structures and examination of design according to British and then European Codes Highly illustrated with numerous line diagrams tables and worked examples Reynolds s Reinforced Concrete Designer s Handbook is a unique resource providing comprehensive guidance that enables the engineer to analyze and design reinforced concrete buildings bridges retaining walls and containment structures Written for structural engineers contractors consulting engineers local and health authorities and utilities this is also excellent for civil and architecture departments in universities and FE colleges **Technical Report** ,1940 *Chemistry and Industry* ,1954 **Mechanical World and Engineering Record** ,1939 *Corrosion* ,1961-07 Issues include special section called Corrosion abstracts *Proceedings* Society of Chemical Industry (Great Britain). Chemical Engineering Group,1954

**Preprints of Papers** Australasian Corrosion Association Inc. Conference, **Fundamental Concepts of Liquid-Propellant Rocket Engines** Alessandro de Iaco Veris,2020-09-26 This book is intended for students and engineers who design and develop liquid propellant rocket engines offering them a guide to the theory and practice alike It first presents the fundamental concepts the generation of thrust the gas flow through the combustion chamber and the nozzle the liquid propellants used and the combustion process and then qualitatively and quantitatively describes the principal components involved the combustion chamber nozzle feed systems control systems valves propellant tanks and interconnecting elements The book includes extensive data on existing engines typical values for design parameters and

worked out examples of how the concepts discussed can be applied helping readers integrate them in their own work  
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each chapter together with information on valuable resources that can be found online Given its scope the book will be of  
particular interest to undergraduate and graduate students of aerospace engineering 3rd fib Congress Washington USA  
FIB - International Federation for Structural Concrete,2010-06-01

## Adopting the Song of Expression: An Psychological Symphony within **Rectangular Tank Design With Horizontal Stiffening**

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