

TECHNIX BITUMEN REACTORS  
PLANT PRESENTATION



**TECHNIX** supplies better bitumen products for road pavements. With over 100 years of experience, Technix continues to build on its reputation and is developing and supplying exciting new bitumen based products that will deliver quality, environmental and cost advantages to our customers. Make our experience your advantage.





**TECHNIX** has a long and illustrious bitumen history. Spanning over a century, it all started in 1914 with the late Sir Russell Matthews who was the first person in New Zealand to apply bitumen to a road surface. He imported the bitumen from Nelson Rockefeller's Standard Oil Company (later SO and then ESSO and now part of ExxonMobil.)





**TECHNIX**





**TECHNIX**



World's first fully computerised bitumen sprayer



**TECHNIX**

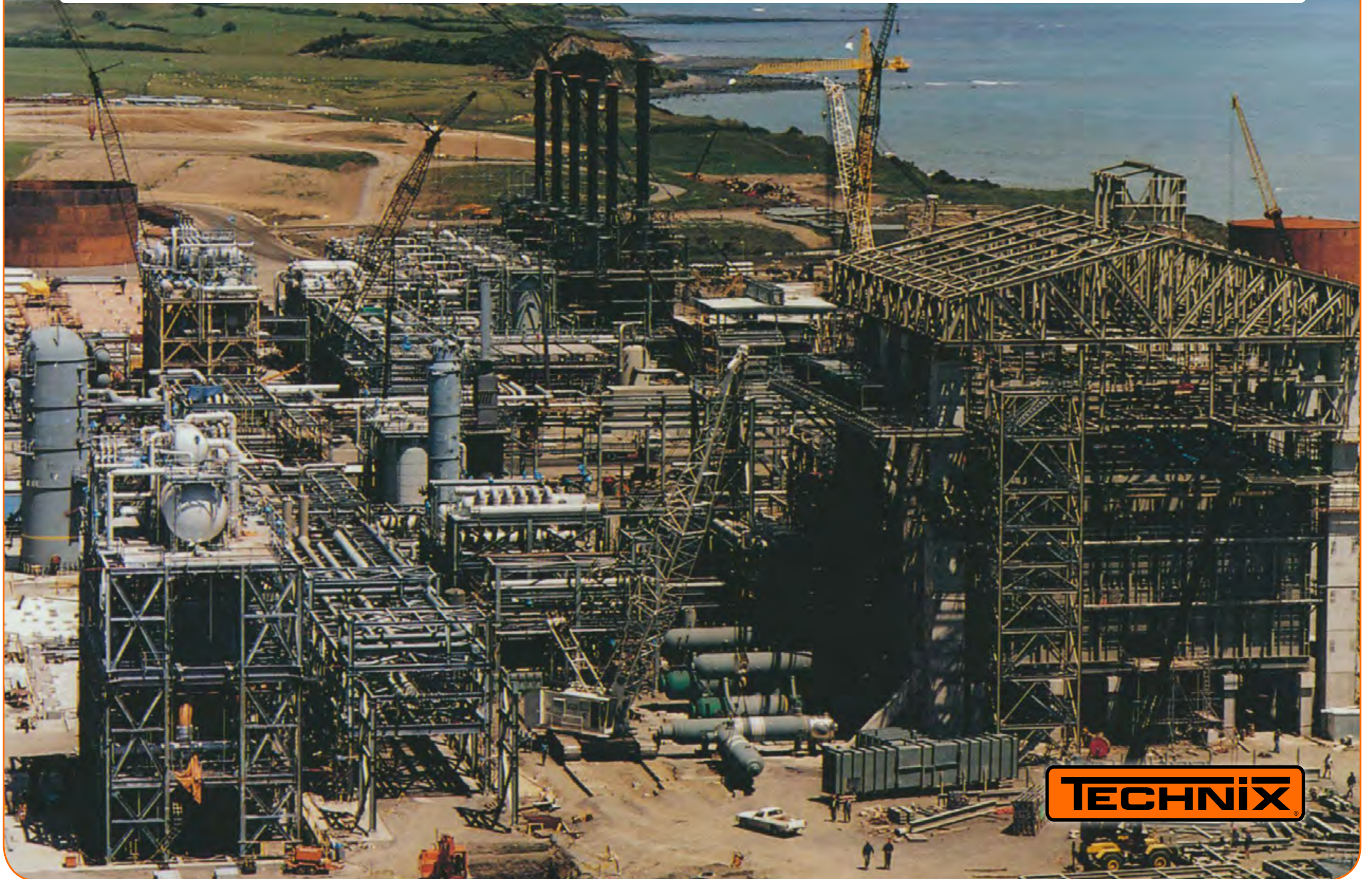
Was a leading roading firm in New Zealand.



**TECHNIX**



Fitzroy Engineering Company, New Zealand's largest heavy engineering company.

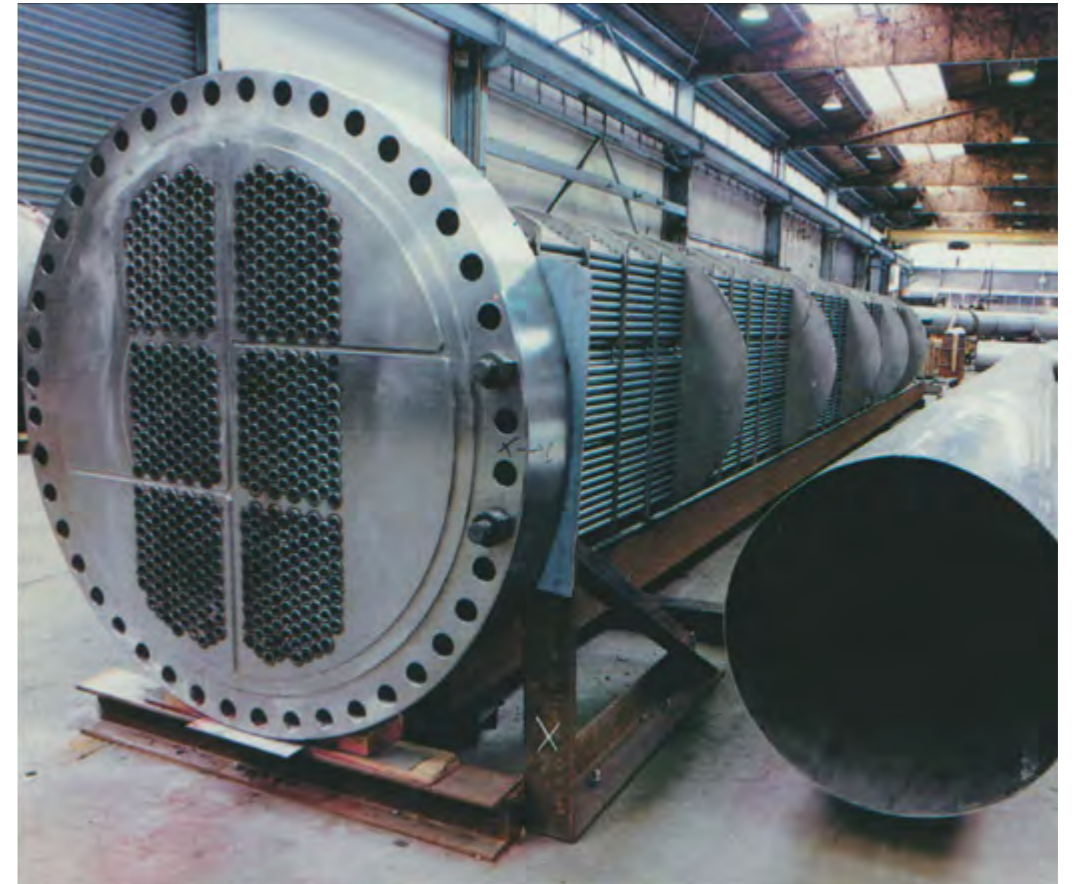


**TECHNIX**





Gas train



Stainless Steel Heat Exchanger



Penstock





600 tonne digester





# 19,000 cubic metre tank relocation





Largest tank to cross an ocean. A steel tank, 41 metres diameter by 14 metres high and weighing 400 tonnes. Shipped from New Zealand to Technix Bitumen Pacific Limited's bulk bitumen terminal in Fiji".



**TECHNIX**





## TECHNIX PACIFIC LIMITED BULK BITUMEN TERMINAL IN FIJI

The Technix Bitumen Reactor plant provides:

Fiji and PNG – Australian Bitumen Specifications;

Tonga and Samoa – New Zealand Bitumen Specifications;

American Samoa – USA Bitumen Specifications;

Tahiti, New Caledonia and Vanuatu – European (French) Bitumen Specifications;

All on a 'just in time' basis with grade changes "on the run".





# FEATURES

## **TECHNIX MULTISTAGE BITUMEN REACTORS FOR**

MODIFYING BITUMENS

**OR FOR**

MANUFACTURING MULTIGRADE BITUMENS

**OR FOR**

HIGHLY EFFICIENT 'JUST-IN-TIME' PRODUCTION OF POLYMER MODIFIED BITUMENS

**OR FOR**

MANUFACTURING INDUSTRIAL GRADE BITUMENS

**OR FOR**

PRODUCING BITUMEN FROM REFINERY DISTILLATION COLUMN RESIDUES (VACUUM BOTTOMS)

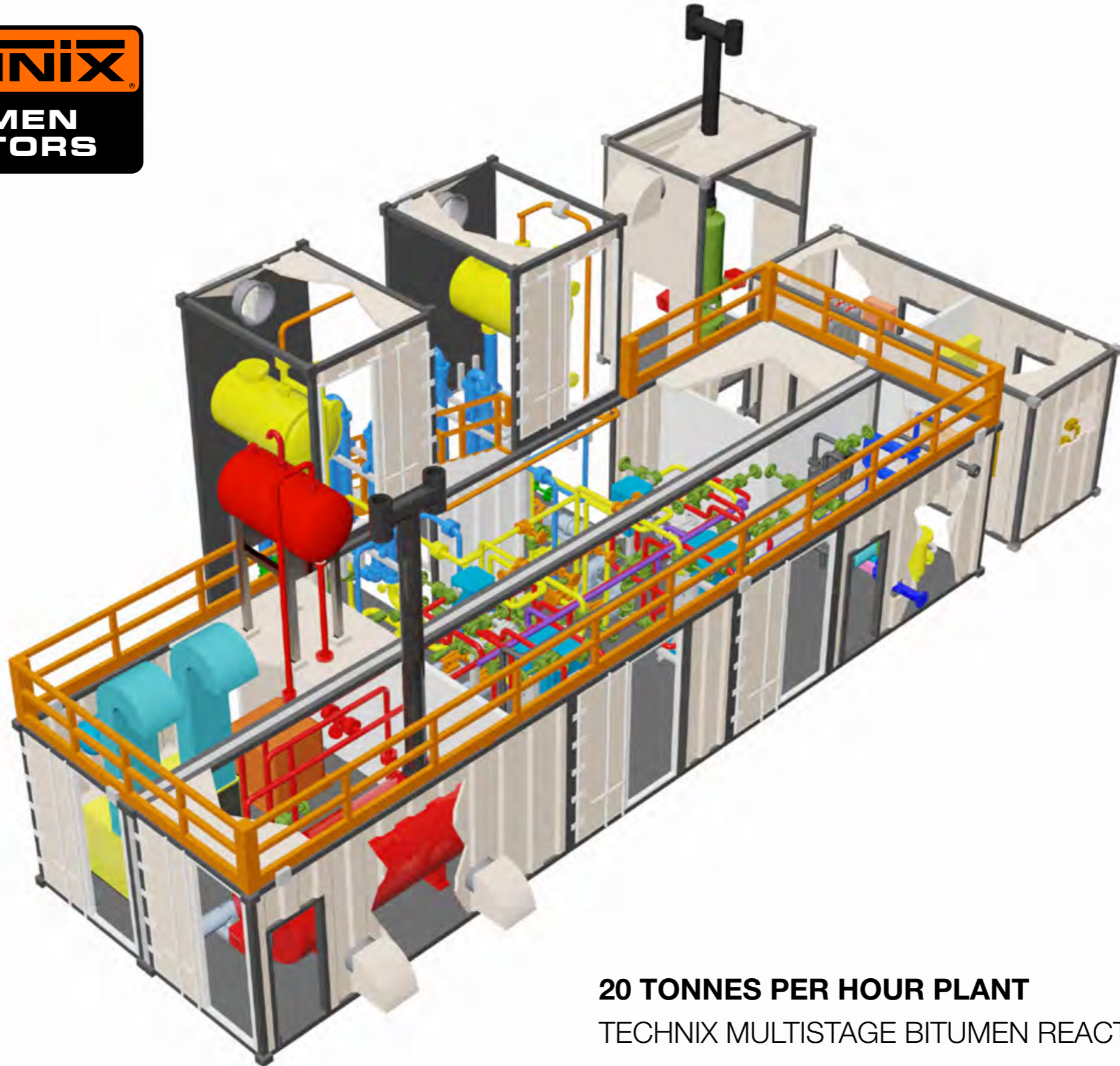
**OR FOR**

PRODUCING BITUMEN FROM REFINERY SOLVENT PRECIPITATED 'ASPHALTS'

**AVAILABLE IN NOMINAL CAPACITIES OF BOTH 20 TONNES PER HOUR AND 40 TONNES PER HOUR.**



**TECHNIX**  
**BITUMEN  
REACTORS**



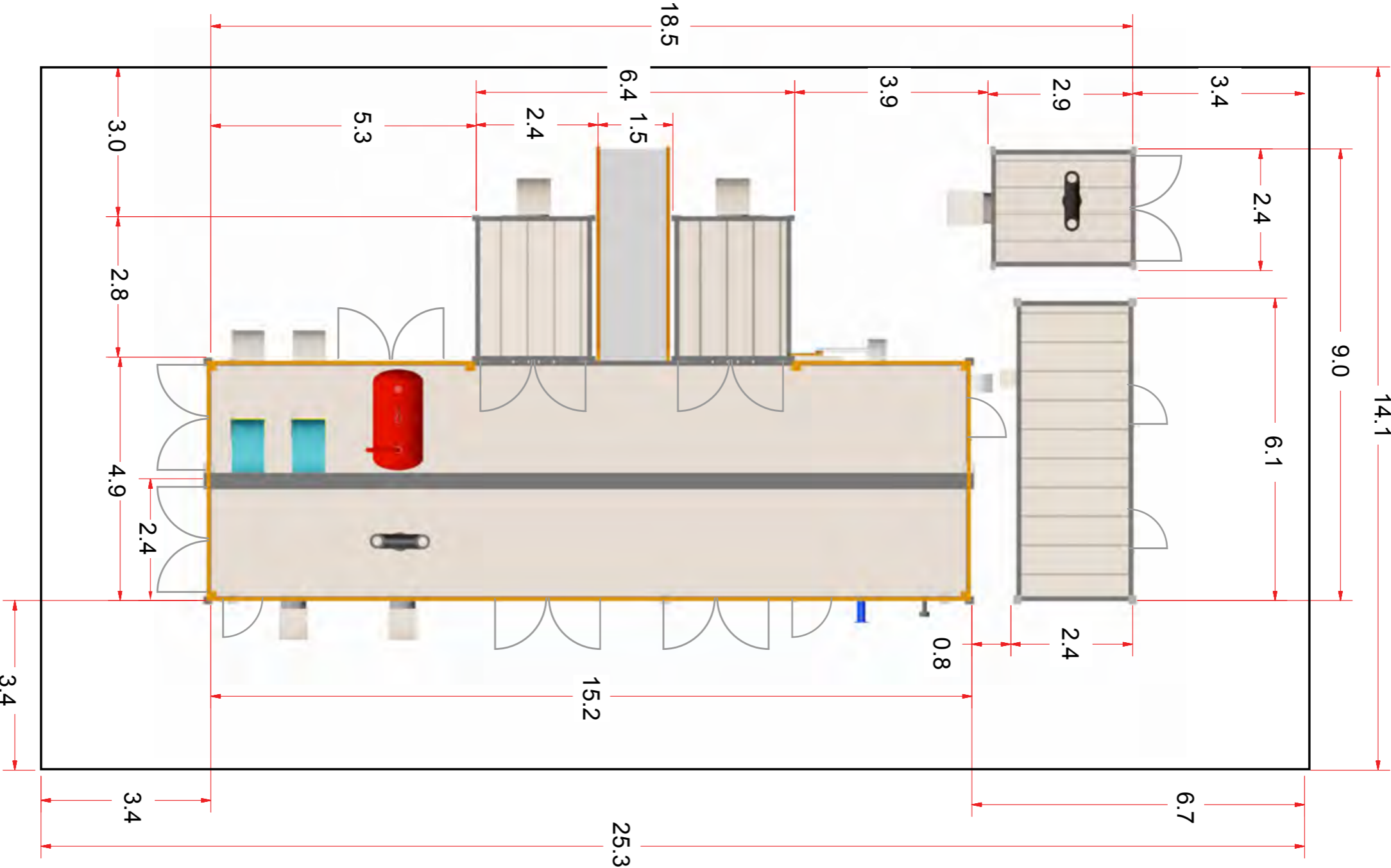
**20 TONNES PER HOUR PLANT**  
TECHNIX MULTISTAGE BITUMEN REACTORS ©





**PLAN VIEW:** Overall dimensions & hard stand area for plant access (*dimensions rounded*)

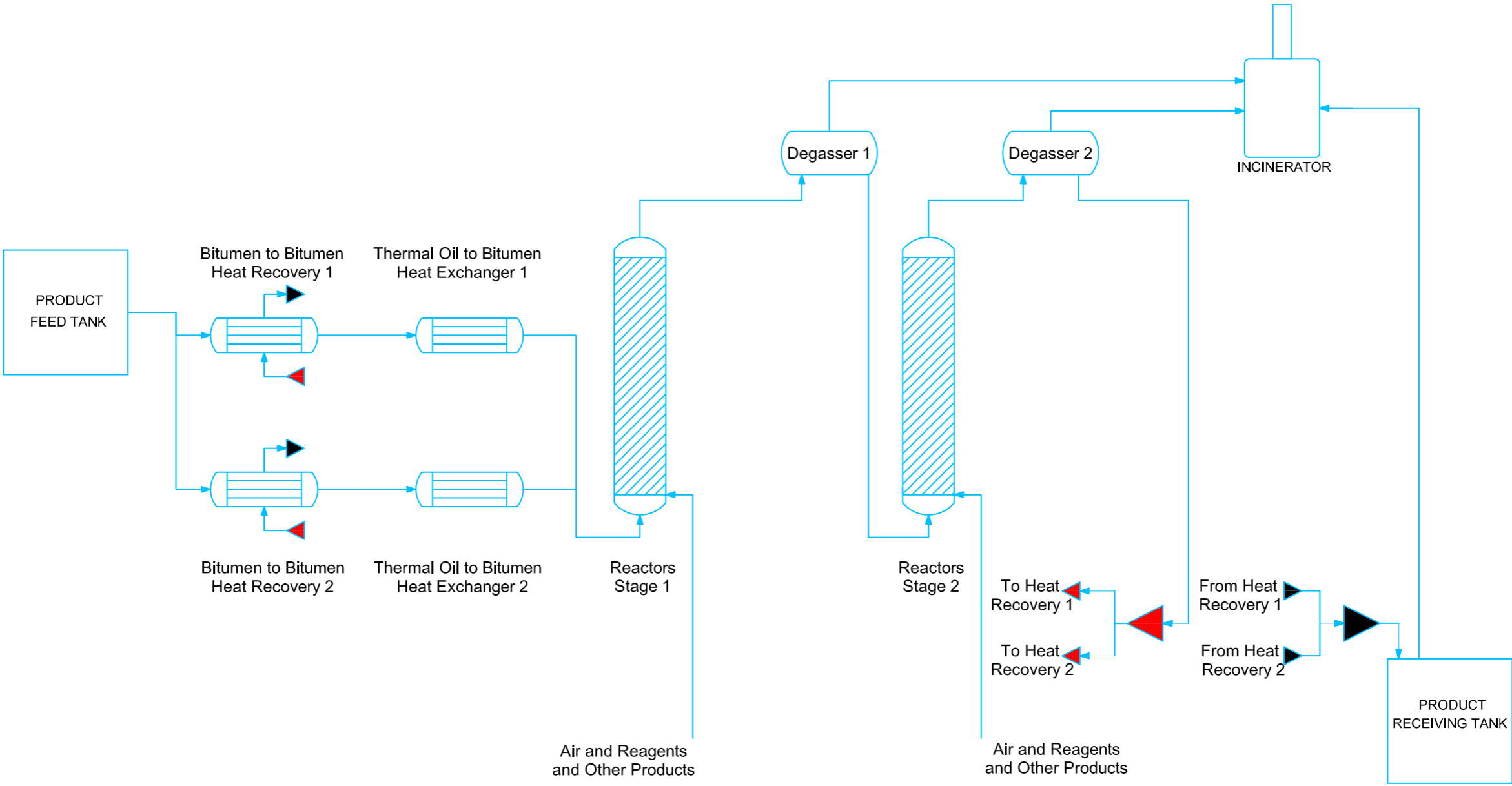
Total plant weight approximately 70 tonnes





# TECHNIX<sup>®</sup>

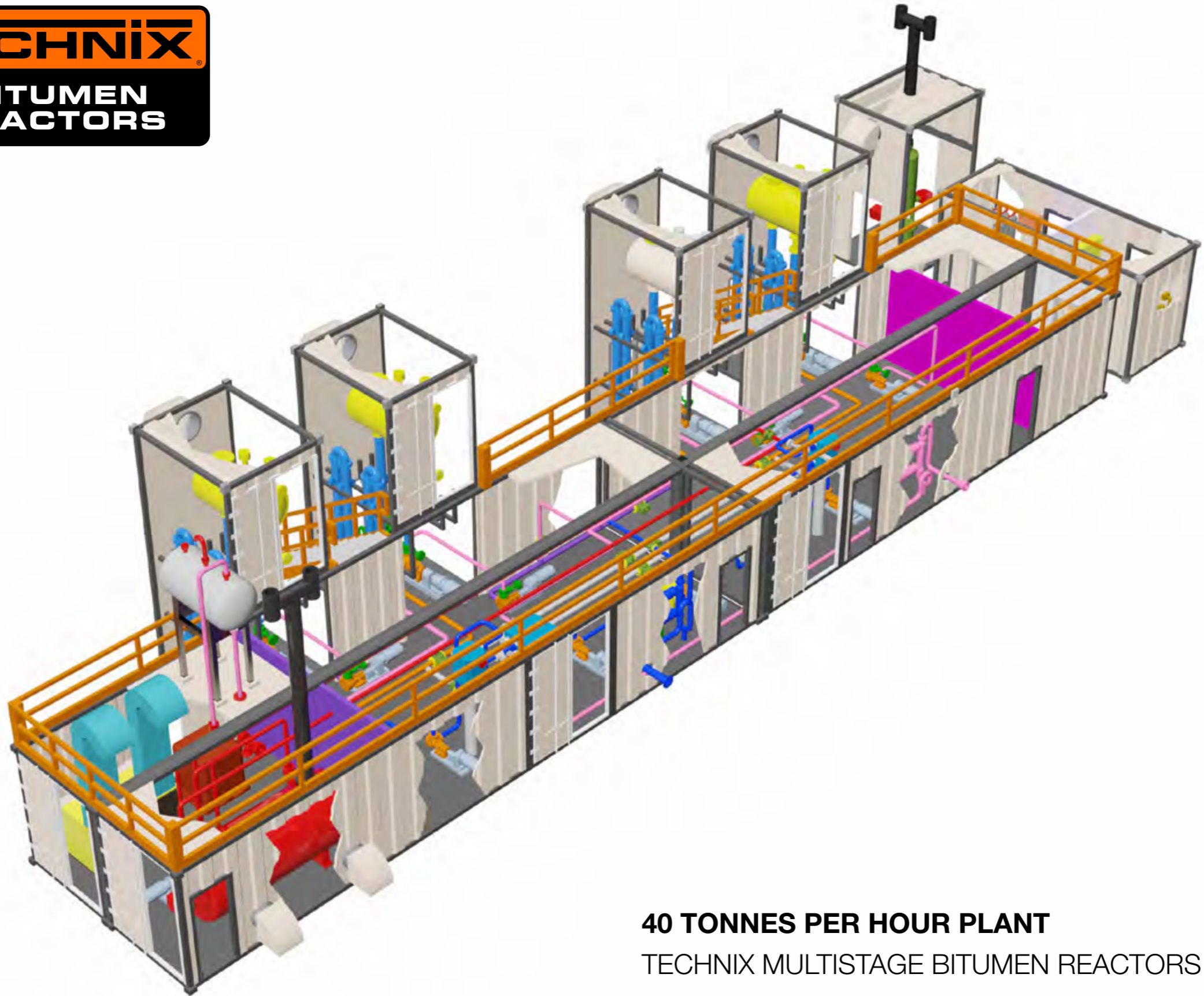
## BITUMEN REACTORS



PROCESS FLOW DIAGRAM



**TECHNIX**  
**BITUMEN  
REACTORS**



**40 TONNES PER HOUR PLANT**  
TECHNIX MULTISTAGE BITUMEN REACTORS ©





## ADDITIONAL FEATURES

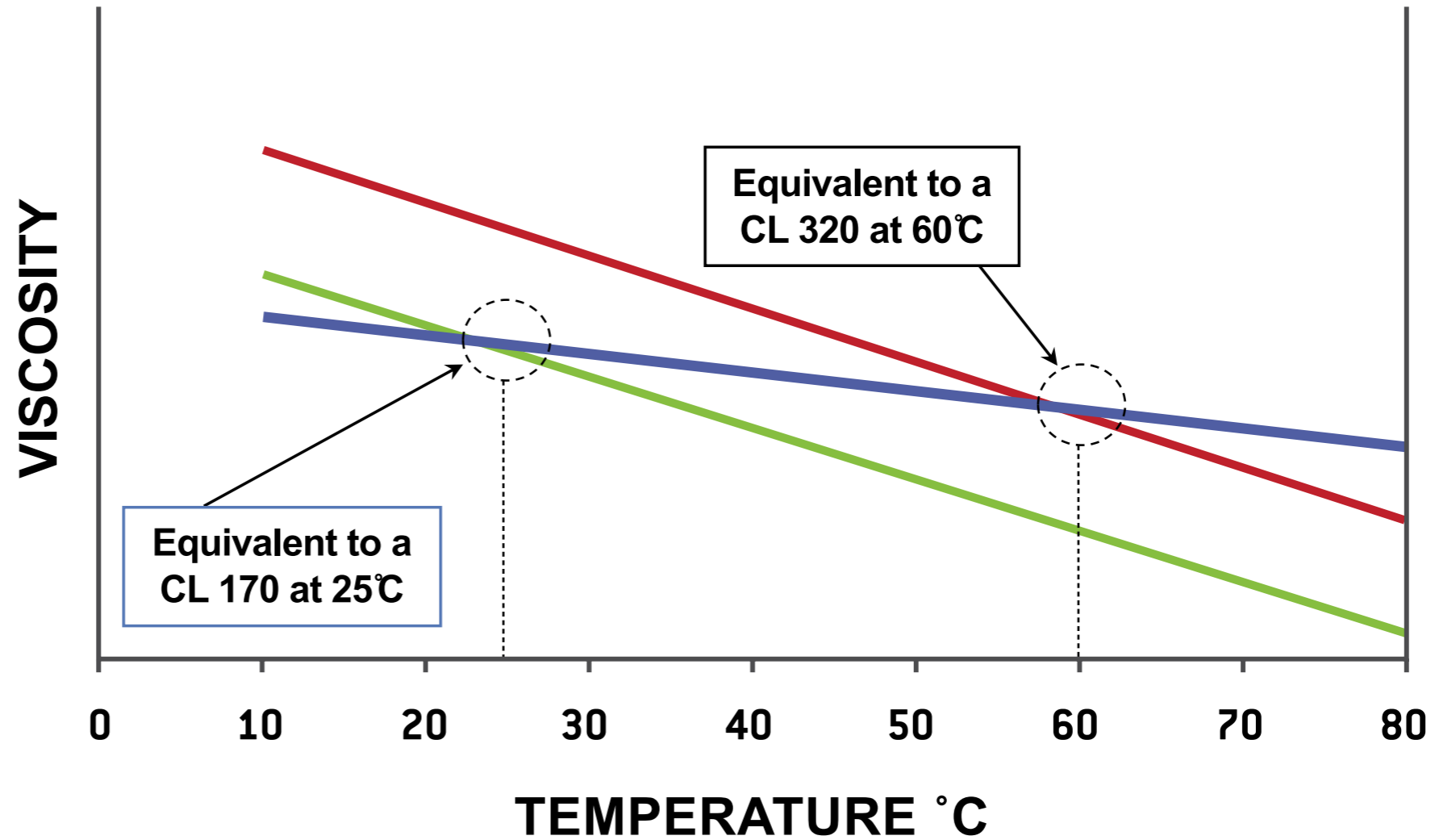
- PLANT FULLY ASSEMBLED AND PRE-COMMISSIONED IN SHIPPING CONTAINERS
- OPERATED CONTINUOUSLY OR INTERMITTENTLY WITH 'PRODUCT CHANGE ON THE RUN'
- COMPREHENSIVELY EQUIPPED
- PRIORITY TO HEALTH AND SAFETY
- PROCESS LOSSES EXTREMELY LOW (0.1%) COMPARED WITH TRADITIONAL PLANTS (2% TO 5%)




**TECHNIX WILL SUPPORT FINAL COMMISSIONING, OPERATOR TRAINING, ONGOING MONITORING AND ADVICE**





# AUSTRALIAN MULTIGRADE M500 (indicative)



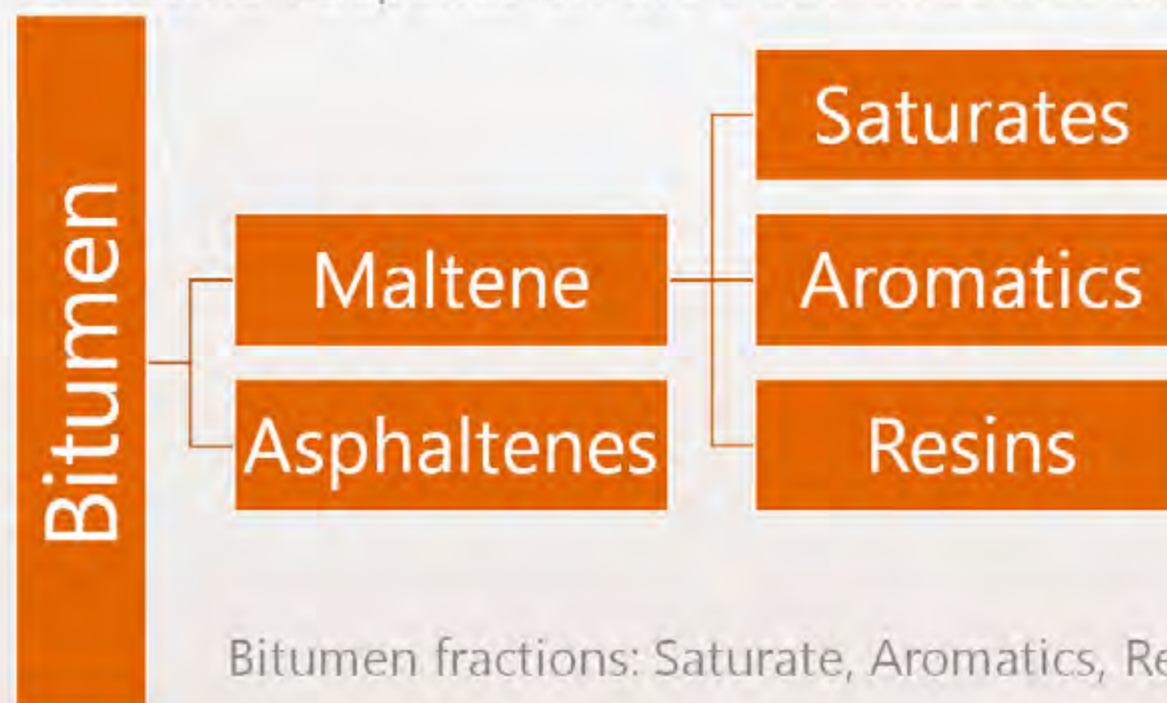
Line Colour	Australian Specification	NZ Equivalent
	CL320	60/70
	M500	M500*
	CL170	80/100



# Bitumen chemical composition

## Bitumen is a complex mixture of organic molecules

- Predominantly hydrocarbons, but also contain small amounts of structurally analogous heterocyclic species and functional groups (heteroatoms) containing sulphur, nitrogen and oxygen atoms as well as trace metals such as vanadium and nickel
- precise composition of bitumen depends on the crude oil source and the processes involved in its manufacture





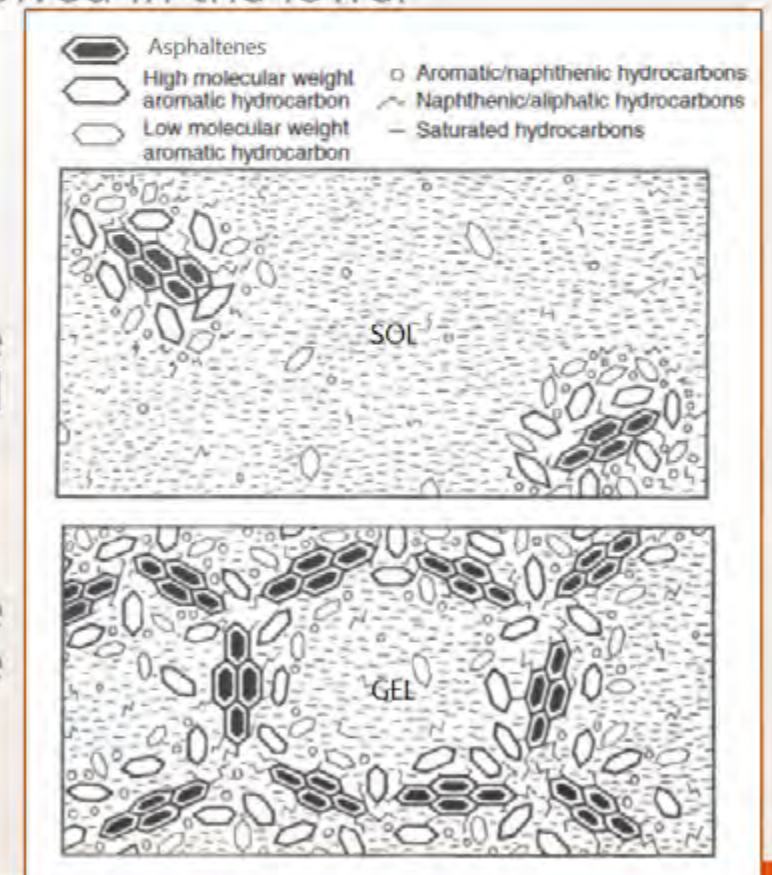
# Bitumen Structure

## Colloidal system

- high molecular weight asphaltene micelles dispersed or dissolved in the lower molecular weight oily maltenes medium

## Two types:

1. well-dispersed solution (SOL) type
  - sufficient quantities of resins and aromatics of adequate solvating power leading to fully peptised, well-dispersed asphaltenes that do not form extensive associations.
2. gelatinous (GEL) type
  - the resin and aromatic fraction is insufficient to fully peptise the micelles and therefore the asphaltenes form large agglomerations or even continuous networks





# Index of Colloidal Instability

The colloidal stability of bitumen can be described by the **Gaestel colloidal instability index**:

$$I_c = \frac{(\text{asphaltenes} + \text{saturates})}{(\text{resins} + \text{aromatics})}$$

- The higher the  $I_c$ , the more the bitumen is regarded as GEL type bitumen.
- The lower the  $I_c$ , the more stable the colloidal structure.
- Recommended range  $\rightarrow 0.22 < I_c < 0.5$
- $I_c > 0.5$  associated with colloidal instability or temperature sensitivity





# BITUMEN RELATED INNOVATIONS AND ACHIEVEMENTS

**Amongst other business activities Technix has been in the bitumen business for over 100 years and is a global leader in bitumen technologies.**



- 1914 Applied the first bitumen to a road surface in New Zealand.
- 1972 Established the first in the world, patented packaging system for bagged bitumen.
- 1981 Manufactured the first polymer modified bitumen in New Zealand.
- 1982 Designed and manufactured the world's first fully computerised bitumen sprayers.
- 1990 Proposed the New Zealand Institute of Highway Technologies.
- 1991 Was the first manufacturer in New Zealand polymer modified bitumen friction course pavements.
- 1992 Introduced New Zealand's first fully computerised pavements micro surfacing machine.
- 1994 Manufactured the first in New Zealand polymer modified bitumen emulsions.
- 1994 Developed the manufacture of an innovative TECHNISEAL treatment of bitumen flushed pavements.
- 1995 Build and operated New Zealand's first diesel-electric heated bitumen rail tank cars.
- 1995 Introduced to the South Pacific Islands bulk bitumen containers.
- 1996 Developed the New Zealand first pavement surfacing of innovative GRIPFIBRE polymer modified bitumen micro-surfacing.
- 1996 Manufactured and laid New Zealand's first SAFEGRIP skid resistance pavement products.
- 1996 Applied New Zealand's first application of chip sealing interfacial adhesion agents.
- 1997 Became the first company in New Zealand to import shipments of bulk bitumen by a non-oil company.
- 1998 Transported the largest tank in the world across an ocean by barge from New Zealand to Fiji.
- 1998 Built the South Pacific Island's first and only establishment of a bulk bitumen terminal.
- 1998 Design and installed the first in the world, floating, ship to shore bulk bitumen transfer pipeline.
- 2004 Designed and built the first in the world bitumen reactor production plant.
- 2005 Is the South Pacific Island's first supplier of Multigrade bitumen.
- 2005 Operated the first and the only plant in the world that produces bitumen products according to Australian, European, USA and New Zealand specifications.
- 2011 Developed the world's first containerised patented bitumen reactor production plant.
- 2013 Development of the world's first patented multistage bitumen reactors plant.
- 2014 Introduction of advanced, patented, high cube bitumen transportation containers
- 2015 Watch this space for two new firsts – one for New Zealand and one global.

**MAKE OUR EXPERIENCE YOUR ADVANTAGE.**





# OUR VALUES



**MISSION** - EMBRACE CREATIVITY

**ETHICS** - PRACTICE INTEGRITY

**ENVIRONMENT** - PROTECT NATURE

**VISION** - STRIVE FOR EXCELLENCE

**SOCIAL** - RESPECT INDIVIDUALITY, LEN LYE CENTRE, NEW ZEALAND INDIGENOUS TREES PARK, AND OMATA STOCKADE.

**SAFETY** - NO INJURIES - EVER!





The Len Lye Centre, New Plymouth



Reconstruction of Omata Stockade at a Technix company indigenous trees park



Fountains





**TECHNIX** WOULD LIKE TO THANK YOU FOR THE OPPORTUNITY TO MAKE THIS PRESENTATION.

