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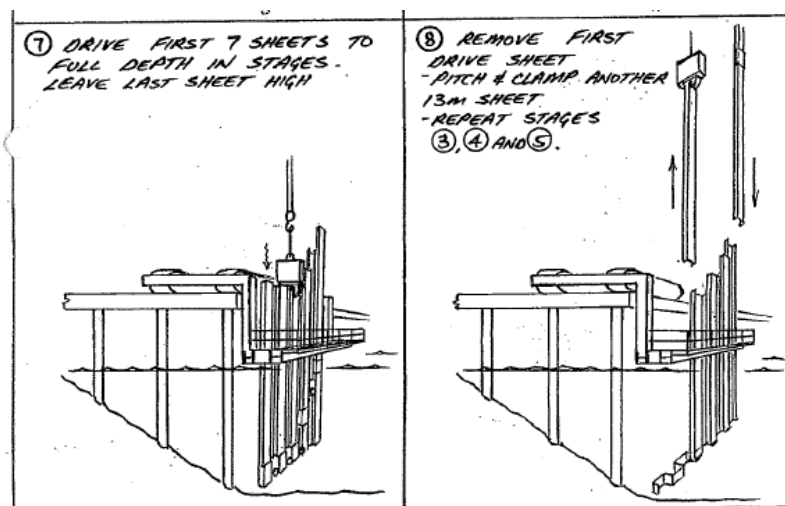
**Project Next Generation  
Construction Management Plan**

**Daniel Smith Industries Ltd**

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**Sheet piling of Container Berth**

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*Prepared by*

**Andy Pullar (Port Otago Ltd)**

**Lincoln Coe (Port Otago Ltd)**

***April 2015***

Printed 1-Jul-15

		Author		Approval for Issue		
Rev	Purpose	Name	Sign	Name	Sign	Date for Issue
1	Consultative Groups Issue					23/04/2015
2	For Construction	ACP		LMC		30/06/2015

## 1. Introduction

This document is to be read in conjunction with the Environmental Management Plan (EMP) for the Next Generation dredging project. This document details a portion only of the overall development works, being the *"Sheet piling of Container Berth"* to be undertaken by *Daniel Smith Industries* during the period July 2015 to November 2015.

The berth Sheet piling is required prior to any deepening, by dredging, of the container berths at Port Chalmers. The Sheet piling is required to maintain slope stability of the rock revetment beneath the wharves. This Contract Management Plan (CMP) does not relate to any of the dredging aspects associated with deepening of the berths.

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## 2. Summary

PROPOSED COMMENCEMENT	13 <sup>th</sup> July 2015
ESTIMATED COMPLETION DATE	30 <sup>th</sup> October 2015
CONSTRUCTION PLANT PROPOSED	Piling Crane Hitachi KH500 (100t) Sheet pile pitching crane IHI CCH300 (30t) Vibro ICE 52B Hydraulic pile hammer BSP 3-5
(See attached spec sheets)	
SHEET PILE and LENGTHS	JFE Steel Sheet Piles – JFESP-3W Length of pile 13m Total sheet pile wall area 3,820m <sup>2</sup> (520t)
CONTACT PERSONS – PORT OTAGO	Andy Pullar Port Otago Limited Direct Dial: +64 3 472 9798 Mobile: +64 21 2298 777 Email: <a href="mailto:apullar@portago.co.nz">apullar@portago.co.nz</a>
CONTACT PERSON – DANIEL SMITH INDUSTRIES	Daniel Smith Ph.: 03 313 9902 Mobile: 021 336 623 Email: <a href="mailto:Daniel@danielsmith.co.nz">Daniel@danielsmith.co.nz</a>

### 2.1 Development & Updating of the CMP

This construction management plan (CMP) has been developed by Port Otago Ltd in accordance with Otago Regional Council resource consent condition number 6 of 2010.197.V1, and the requirements within the EMP.

As with the development of the design & execution of the capital dredging works, this CMP will also be an iterative and evolving process. This CMP document will be a "live" document - ever developing in response to changes and findings.

The three areas discussed as follows will be the key drivers for change or alteration of the CMP:-

1. Additional dredging & disposal, or construction activity. This will include the specific input from the Contractors(s) with respect to their equipment & methodology.
2. Comments or input from Technical Group members and / or Otago Regional Council;
3. Input resulting from changes to construction methodology etc... resulting from monitoring and reporting undertaken as part of daily / weekly works.

All revisions of the D&DP will be issued directly to consultative group members, and the most recent versions being displayed on the POL website.

## 2.2 Key Personnel

As required by the EMP and consent conditions the following are key personnel for the project and contact details:

Role	Company	Name	Phone	Email
GM Infrastructure	Port Otago Ltd	Lincoln Coe	DDI 03 472-9884 Cell 021 2298884	<a href="mailto:lcoe@portotago.co.nz">lcoe@portotago.co.nz</a>
Project Manager	Port Otago Ltd	Andy Pullar	DDI: 03 472 9716 Cell 021 627 188	<a href="mailto:rmcgrouther@portotago.co.nz">rmcgrouther@portotago.co.nz</a>
Contract Manager	Daniel Smith Industries	Daniel Smith	Ph 03 313 9902 Cell 021 336623	<a href="mailto:Daniel@danielsmith.co.nz">Daniel@danielsmith.co.nz</a> <a href="mailto:admin@danielsmith.co.nz">admin@danielsmith.co.nz</a>
Site Foreman	Daniel Smith Industries	Trevor Schimanski	Cell 021 336 620	
Harbour Control (24hrs)	Port Otago Ltd		DDI: 03 472 9882	<a href="mailto:harbourcontrol@portotago.co.nz">harbourcontrol@portotago.co.nz</a>
Otago Regional Council	ORC	Pollution Hotline	0800 800 033	To report oil or fuel spills in the harbour.

### 3. Project Construction Activities

#### 3.1 Introduction

The installation of a sheet pile retaining wall is required on the berths at Port Chalmers to ensure deepening of the berth pockets does not cause instability of the existing rock revetment beneath the wharves. The work to be undertaken is common construction practice.

The driving of sheet piles shall be completed by working from the existing wharf structure with no water based plant to be utilised. Daniel Smith Industries will be the lead contractor on these works with steel to be supplied by JFE.

#### 3.2 Location of Works

The proposed works are to be undertaken in the Port Chalmers Container Terminal (PCCT) located at 15 Beach Street, Port Chalmers, Dunedin. The PCCT has three main wharf areas; the container wharf area; the multi-purpose wharf area; and the Beach Street wharf area.

The first stage of work, and that related to this CMP, incorporates works on the container wharf **only** and is shown below. It is planned to complete the sheet piling works on the multi-purpose wharf in 2016.



Figure 1 Site Location: Container Wharf Port Otago

The seabed conditions in this area are comprised of marine silts with an underlying foundation of breccia rock. The sheet piles will be driven to a set depth unless the bedrock is encountered.

### 3.3 Equipment and Materials

The following equipment is proposed to be used, with details of cranes and hammers included as Appendix A :-

- One Hitachi KH500 (100t) crawler crane: used for driving the sheets with the hydraulic hammer attached;
- One IHI CCH300 (30t) crawler crane: used for sheet pile pitching and positioning;
- Vibro ICE 52B;
- Hydraulic pile hammer BSP 3-5 and power pack;
- One purpose built mobile pile gate;
- One purpose built mobile pitching sleeve.

The following materials are proposed to be used:

- 390 No. 13m long JFESP-3W permanent sheet piles;
- 10 No. 17m long JFESP-3W temporary driving sheet piles;
- 30 No. QuayQuip rubber element fender units including steel fender panel and fixings

### 3.4 Methodology

The proposed methodology involves the installation of a sheet pile wall utilising a 30 tonne crawler crane for pitching and placing the piles and a 100 tonne crawler crane with a vibratory hammer to drive the piles. The piles are to be driven through a frame or pile gate from the existing wharf structures to ensure the correct alignment.

A schematic of the operation and following described methodology are included in Appendix 2 of this CMP.

1. The current wharf fenders are removed to allow pile driving to take place;
2. The driving gate and a pitching sleeve (to ensure piles are vertical allowing connection) are positioned to locate and guide the piles as they are being driven;
3. The pile gate attaches to the edge of the wharf and extends approximately 12.4 metres onto the wharf deck. It has a depth of approximately six metres and has provision for ten piles, three locating and seven fully driven. The pile gate acts as a stable securing system and is designed to minimise the positional error at the bottom of the pile;
4. A permanent 13m long sheet is placed into the pitching sleeve;
5. The temporary 17m driving sheet is attached to the permanent sheet with a hydraulic clamp;
6. The combined 30m sheet is lifted from the pitching sleeve and is placed into the pile gate with the sheet clasp connecting to the previous sheet already in place;
7. The combined sheet is driven 3-4m into the seabed with vibro to fix in place;

8. Next nine sheets are placed and partially driven;
9. First seven sheets are then fully driven with last sheets left high for next set;
10. Driving sheets are removed then pitched and clamped onto next permanent sheet;
11. The pile gate is repositioned as sheet pile wall progresses;
12. The new wharf fenders are replaced as the wall is completed.

This sequence is repeated along the length of the wharf working from north to south.

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## 4. Construction Programme

An indicative programme has been prepared by Octa Associates in conjunction with Port Otago and Daniel Smith Industries. This programme is attached in Appendix 3. The contract duration is shown as 16 weeks and is based on a productivity of 6 piles per day over a 5 day working week. This is a conservative productivity with the duration expected to be less.

The following are key dates from the Octa Associates programme:

- Site possession 13 July 2015
- First 100m handed back 17 August 2015
- Second 100m handed back 21 September 2015
- Piling complete 11 November 2015
- Disestablish 20 November 2015

Fortnightly project meetings will be held once the physical works are underway with frequent programme reviews completed based on actual productivity.

## 5. Environmental Aspects

### 5.1 Relevant Consents

The following consents are applicable to the Sheet piling works.

- RM 2010.197.V1 – Disturb foreshore & sea-bed.
- RM 2010.200.V1 – To erect structures within the coastal marine area.

### 5.2 Environmental Restrictions

There are no explicit environmental restrictions associated with these works.

### 5.3 RM 2010.197.V1 Consent Condition 6

The following condition 6 from Consent 2010.197.V1 is relevant to these works.

#### **Performance Monitoring**

6. The consent holder shall include in the Environmental Management Plan prepared for Coastal Permit 2010.200 the following details for the works authorised by this consent. The disturbance component of the Environmental Management Plan shall incorporate industry best practice and include but not be limited to the following:

- (a) a description of how the disturbance occurs;
- (b) a description of the sources and sizes of rock to be used;
- (c) construction methods to be implemented to minimise the disturbance and associated plumes of sediment laden water; and
- (d) methods to be implemented to relocate resident crustaceans from the site and remove any mammals, birds or fish from the site before and during works.

Any changes to the Environmental Management Plan shall be made after consultation with the consent authority and shall be submitted to the consent authority for review and certification prior to those changes being implemented.

The following discussion addresses each of the points as follows.

- 6(a) describing disturbance.
  - The only disturbance of the seabed is a maximum 1m wide strip along the full length of the sheet-pile wall. This is where the sheet-piles themselves penetrate the sea-bed.
- 6(b) description of rock
  - The Daniel Smith Industries scope of work DOES NOT include any rock work or associated disturbance.
- 6(c) methods to minimise disturbance and associated plumes.
  - The construction method and design of the sheet-pile wall, by its sheer nature minimises the disturbance of the sea-bed. It avoids any excavation of the underwharf slope and placement of rock back on the excavated slope. The only disturbance that will occur and plume will be in the immediate vicinity of the pile that is being vibrated at that time, which is a very local disturbance at 13m within the berth pocket.

- 6(d) relocate crustaceans, remove mammals, birds or fish
  - A dive survey along the line of the sheet-pile wall will be undertaken to establish whether there is any impediments or obstructions to driving. This survey will identify whether there is any crustaceans in the immediate of the sheet-piling that will require relocation. Relocation would be by diver to an existing wharf where there is a known existing & resident population.
  - Prior to the first sheet-piles being driven an underwater walk survey will be undertaken. Any mammals or birds noted as being present will be assisted or encouraged to sites remote or away from the work area.

## 5.4 Noise

Condition 5 of Consent 2010.197.V1 requires compliance with the Construction Noise Standard NZS 6803 (1999).

In order to achieve compliance with this standard, work hours will be restricted.

No pile driving will be undertaken between the hours of 2000hrs (8:00pm) and 0630hrs (6:30am) Monday to Saturday.

The existing Scotia St noise monitor is situated well to receive noise from the construction activity, and review of this monitoring data could be used to ensure compliance with the construction noise standard.

## 5.5 RM 2010.200.V1 Consent Condition 5

The following condition 5 from Consent 2010.200.V1 is more relevant to these works.

### Performance Monitoring

5. The consent holder shall prepare an Environmental Management Plan for the extension of the Multi-purpose Wharf, rock revetment/buttress and Fishing Jetty works authorised by the above specified consents. This plan shall be prepared in consultation with the consent authority, and submitted to the consent authority for review at least one month prior to any works authorised by Coastal Permits 2010.197, 2010.199, 2010.202, 2010.203 and 2010.205 commencing. The consent authority's review is for the purpose of certifying compliance and consistency with the consent conditions. The Environmental Management Plan shall incorporate industry best practice and include but not be limited to, the following:
  - (a) a list of key personnel and points of contact;
  - (b) a description of the proposed works;
  - (c) a description of the staging plan for the proposed works which shall identify each specific activity and proposed duration of each stage;
  - (d) a description of the expected construction and development methodology;
  - (e) a summary and timetable of all reporting required under this consent, Coastal Permits 2010.197, 2010.199, 2010.202, 2010.203 and 2010.205 and the Environmental Management Plan and the relevant periods that they cover;
  - (f) a description of what actions will be taken to adaptively manage the actual or potential effects of consented activities (including relating to noise, contamination, water quality, aquatic communities) to satisfy consent conditions;

- (g) contingency measures for the accidental spill of contaminants into the coastal marine areas including fuels, oils and cement products;
- (h) the allocation of responsibility for updating the plan should future amendments be required; and
- (i) any items required by Coastal Permits 2010.197, 2010.199, 2010.202, 2010.203 and RM10.193.01 to be included in this Environmental Management Plan.

Any changes to the Environmental Management Plan shall be made after consultation with the consent authority and shall be submitted to the consent authority for review and certification prior to those changes being implemented.

These conditions are satisfied in the preparation of this CMP.

## 5.5 Operation of Machinery

Condition 11 of the consent is relevant, and is addressed in the following manner.

### On Wharf

The cranes, as well as the power-pack will all be on the wharf, and over the marine environment. Prevention and treatment of oil and fuel spills is of high importance. In order to reduce the chance of spillages the following will be considered:

- Store the absolute minimum amount of fuel required for day-to-day operation of quarry plant on site;
- Storage of this fuel and oil should be well away from creeks or watercourses and where available within an earth bund;
- Refuelling of machines will be undertaken by trained personnel in a designated refueling location and manner;
- Spill kits shall be kept in known locations on site and within 100m of any working machinery;
- Spill kits will contain as a minimum:
  - Sawdust (or equivalent absorbent material);
  - An absorbent boom;
  - Absorbent matting;
  - Disposable overalls, gloves and boot covers;
  - A designated container for the disposal of contaminated equipment and soil.
- Spill kits must be checked regularly to ensure they are fully stocked.

If a spill to ground occurs:

- The source and nature of the spill must be identified and isolated to prevent any further discharge;
- Contain the spill using materials from the spill kit in the first instance and / or other suitable available material.
- Clean up and dispose contaminated material in an approved disposal facility, under no circumstances is this material to be disposed on site.
- A review of refueling procedures and locations will be undertaken and remedial measures implemented.

If a spill to harbour waters :-

- Immediately contain the spill using the absorbent boom or matting as contained in the spill kit;
- Identify and isolate the source of the spill;
- Clean up and dispose absorbent matting or boom and dispose of in an approved disposal facility. Chemical dispersants are not to be used;

- In the case of substantial spills (>50litres) the Otago Regional Council must be contacted;
- A review of refueling procedures and locations will be undertaken and remedial measures implemented.

Regular maintenance as well as operator inspection of equipment being used should be undertaken to identify any potential areas of risk, and any item requiring attention or remedial action undertaken with the highest priority.

#### Over and On Water

The only machinery or equipment that is operating over and within the harbour waters will be :-

1. Vibrating hammer (ICE 52B) which attaches to the top of the driving sheet and is out over the water whilst sheets are being driven.
2. The hydraulic clamp on the 17m driving sheets. This is at the bottom of the driving sheet and connects hydraulically onto the top of the 13m pile that is being driven.

The key risk is to identify is any hydraulic leak that may occur which could cause hydraulic oil to enter the harbour water. In order to minimise the effect of the hydraulic oil, the piling equipment, vibros and hydraulic jaws all utilise biodegradable hydraulic oils. The MSDS for the hydraulic oil is included within Appendix 4 along with the Daniel Smith Industries Environmental Policy.

A methodology should be incorporated into the daily work flow to ensure visual inspections and of the key areas of risk, particularly associated with the hydraulics on the driving sheets. In addition assessment of how a potential failure will be identified should be undertaken, with these methods adopted as part of the standard work procedures.

## **APPENDIX 1: CONSTRUCTION EQUIPMENT**



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 Email: daniel@danielsmith.co.nz

# HITACHI

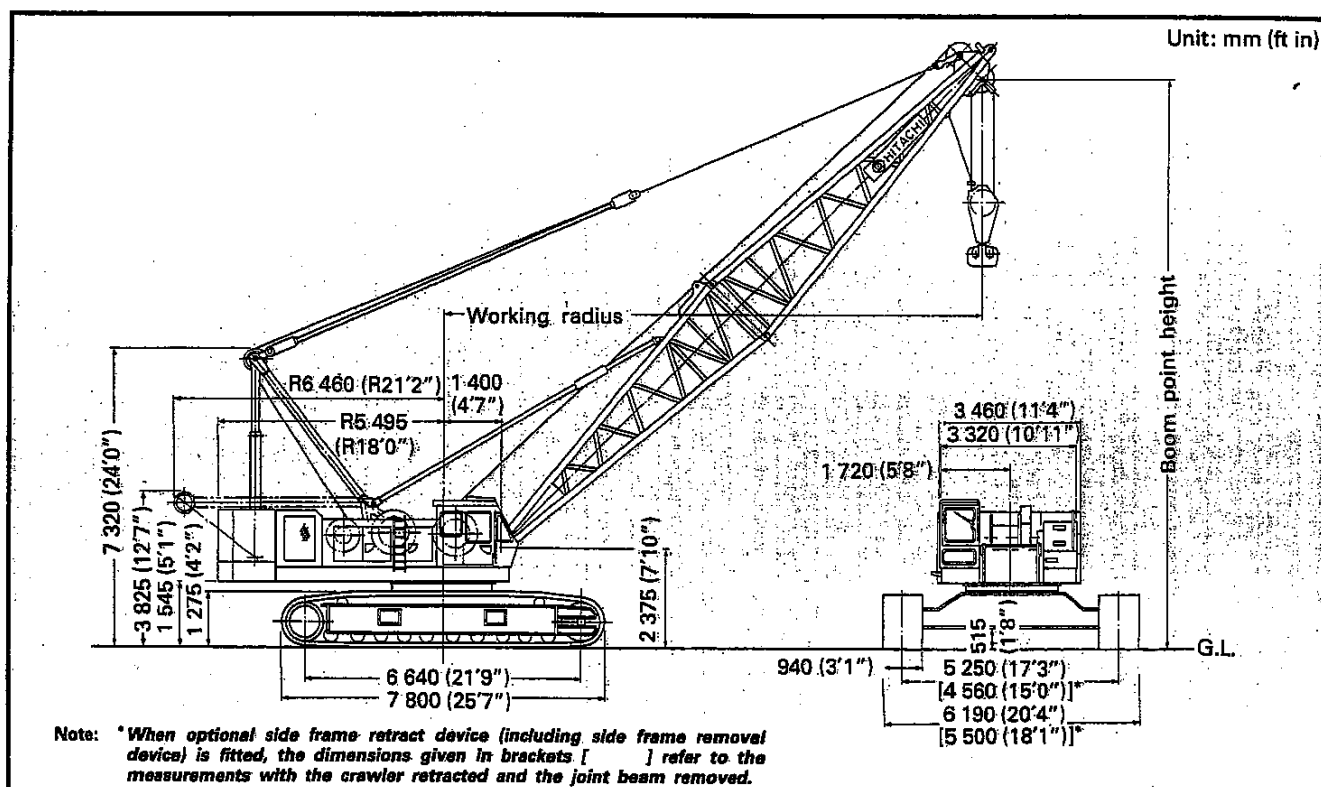
## KH 500-3

### 100 Ton Crawler

Page 1 of 8

## Dimensions

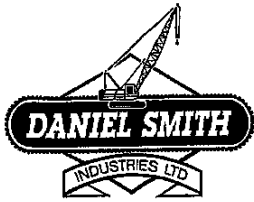
Unit: mm (ft in)



## Specifications

<b>Maximum rated load</b>		100 000 kg (220 500 lb) at 5.5 m (18'1") working radius
<b>Boom</b>	Basic boom length	16.0 m (52'6")
	Max. boom length	73.0 m (239'6")
	Jib length	9.0 m (29'6") to 22.5 m (73'10")
	Max. boom with jib length	83.5 m (273'11") [61.0 m (200'2") + 22.5 m (73'10")]
<b>Swing speed</b>	High	0 to 2.3 min <sup>-1</sup> (0 to 2.3 rpm)
	Low	0 to 1.4 min <sup>-1</sup> (0 to 1.4 rpm)
<b>Travel speed*</b>	High	0 to 1.3 km/h (0 to 0.81 mph)
	Low	0 to 0.9 km/h (0 to 0.56 mph)
<b>Gradeability</b>		17° (30%)
<b>Ground pressure</b>		0.77 bar (0.77 kgf/cm <sup>2</sup> , 10.9 psi)
<b>Operating weight</b>	Equipped with basic boom, 100 000 kg (220 500 lb) capacity hook and 33 400 kg (73 600 lb) counterweight	103 000 kg (227 100 lb)
<b>Engine</b>	Model	ISUZU 6RB1T
	Rated horsepower	206 kW (280 PS) at 2 000 min <sup>-1</sup> (2 000 rpm)

\*Speeds may vary with load



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# IHI

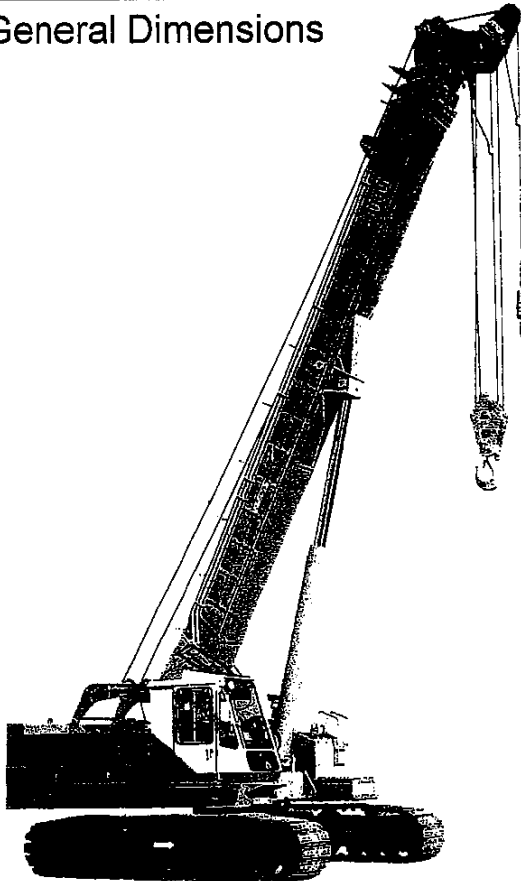
## CCH 300T

### 30 Ton Telescopic Crawler

Page 1 of 2

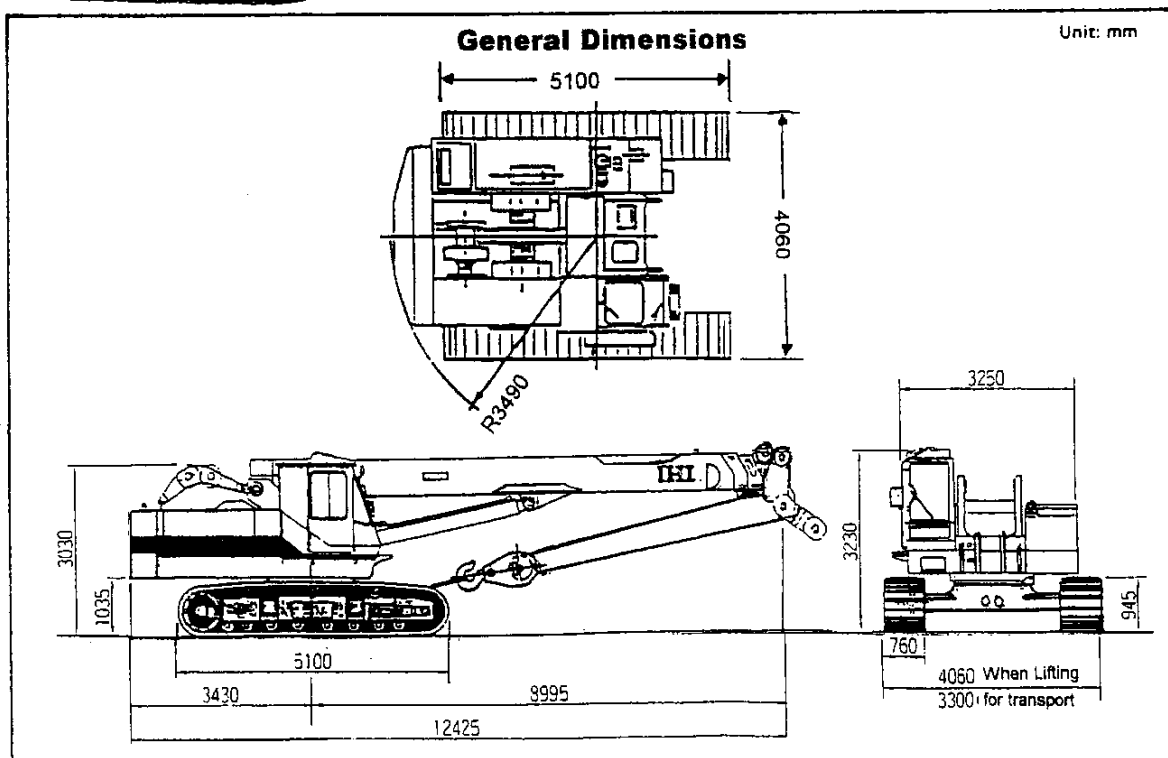
#### General Dimensions

Unit: mm

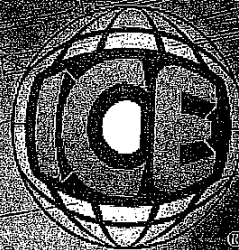


**Utilizing advantages  
 provided by the  
 telescopic boom and  
 crawler drive design  
 with lift and move  
 capability.**

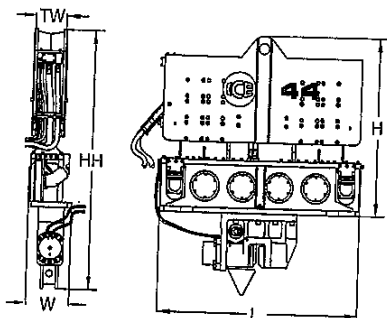
**Designed for quick set  
 up, general purpose  
 lifting and heavy duty  
 cycle foundation work.**



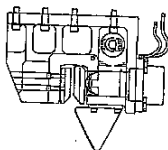
# ICE® Model 52B Hydraulic Vibratory Driver/ Extractor with Model 595G Power Unit



## Dimensions

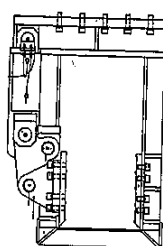


## Clamps & Accessories



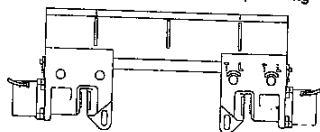
**Model 140C  
Sheeting  
Clamp**

Clamping force  
140 tons, 1245 kN  
Weight  
2,200 lbs, 1000 kg



**Model 85  
Wood, Concrete  
& Pipe Clamp**

Clamping force  
85 tons, 756 kN  
Weight  
6,500 lbs, 2950 kg



**6.5' Caisson Beam with  
Model 100BH Caisson Clamps**

Clamping force  
220 tons, 1975 kN  
Weight  
4,610 lbs, 2090 kg

## Other Model 52B Accessories

12' Caisson beams  
10' Clamp extension  
90° Turning plate  
Bias weights  
26" leads sled  
Low-headroom suppressor  
Vibrator stand  
Wireless remote

## Model 52B Vibrator Specifications

Eccentric moment	51 kg-m
Maximum frequency	1800 vpm
Centrifugal force	1800 kN
Amplitude (free w/o clamp)	28 mm
Standard line pull for extracting	483 kN
Maximum line pull for extracting	725 kN
Weight (no clamp or hoses)	5650 kg
Non-vibrating weight	2070 kg
Height without clamp (H)	2135 mm
Length (L)	2470 mm
Width (W)	560 mm
Throat width (TW)	362 mm
Hydraulic hose length	46 m
Hydraulic hose weight	650 kg
Height with sheeting clamp* (HH)	3096 mm
Weight with sheeting clamp & 1/2 hoses*	6970 kg
Height with beam & caisson clamps* (HH)	2784 mm
Weight with beam & caisson clamps*	8065 kg

\* See "Clamps and Accessories Manual" for in-depth description

## Model 595G Power Unit Specifications

Engine	CAT C15
Power	444 kW
Operating speed	1800 rpm
Max. motors pressure	380 bar
Motors flow (no load)	595 lpm
Clamp pressure	310 bar
Clamp flow	21 lpm
Weight (w/ full fluid & 1/2 fuel)	8390 kg
Length	4215 mm
Width	1830 mm
Height	2465 mm
Hydraulic reservoir	1630 liters
Fuel capacity	570 liters

International Construction Equipment, Inc.  
Warehouse Drive  
Greensboro, NC 27404 USA  
ICE-USA1 / 704-821-8200  
iceusa.com / www.iceusa.com

Constant improvement and engineering progress make it necessary that ICE, Inc. reserve the right to make specification changes without notice. Please contact ICE for the latest available information.

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UN4491 595G 11-2012



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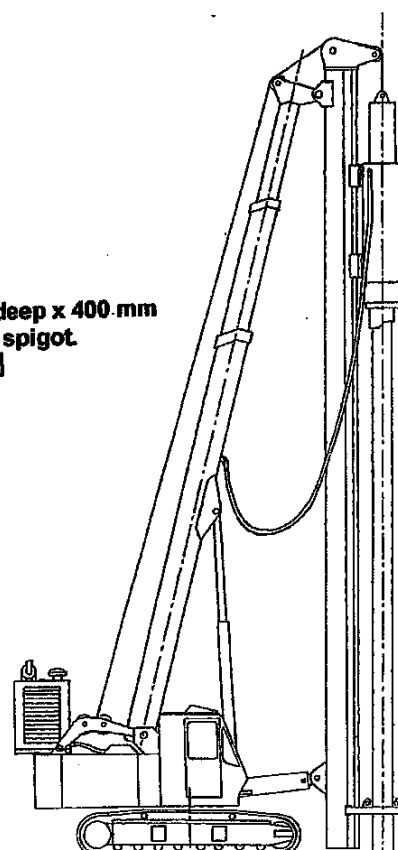
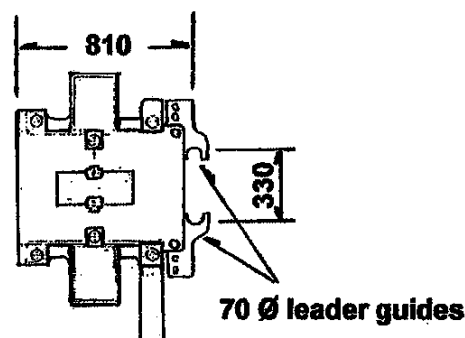
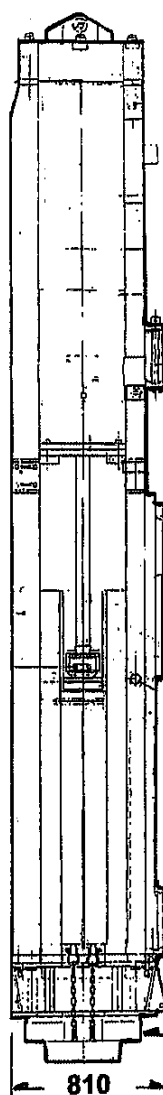
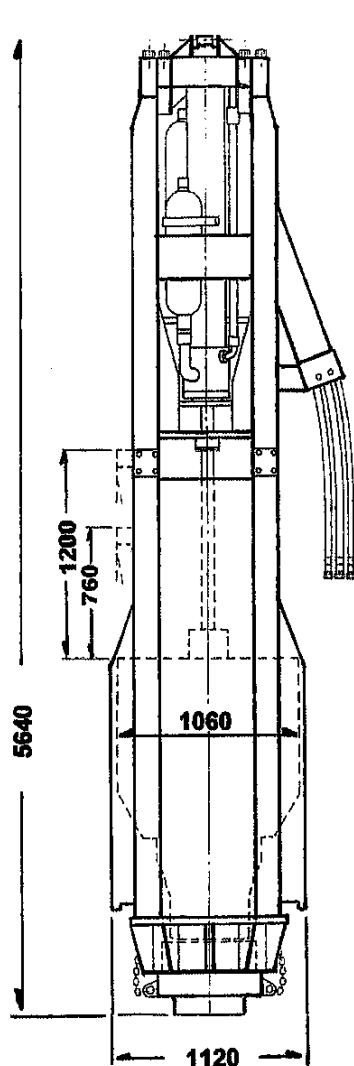
Website: [www.danielsmithindustries.co.nz](http://www.danielsmithindustries.co.nz)

# basp

## H3

# Hydraulic Hammer

Page 1 of 2



Ram weight	3000 kg
Cap & dolly weight	520 kg
Driving energy @ 1.2m max. stroke	3600 kgm
Blow rate @ max. driving stroke	46 bpm
Extracting force @ 0.76m max stroke	80 tonne
Min. tamping energy	450 kgm
Blow rate @ min. tamping	110 bpm
Weight of hammer	6100kg
Hose weight (full)	10 kg/m
Max. oil flow	180 l/min
Hydraulic pressure required	240 bar



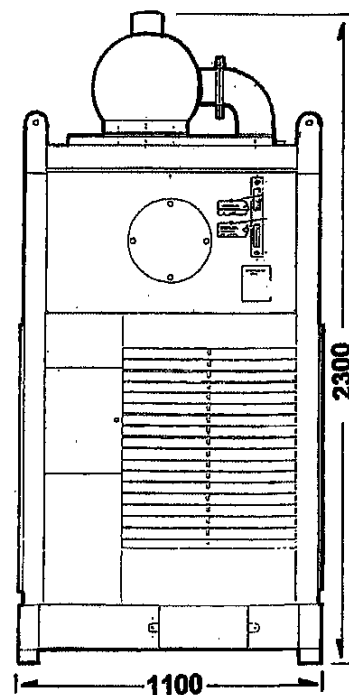
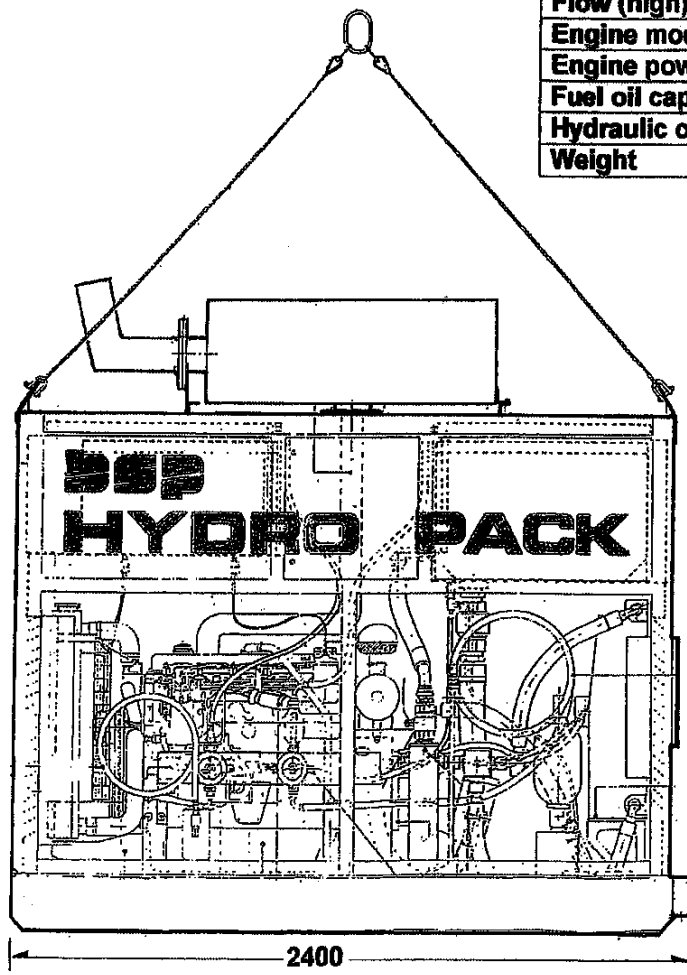
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# bsp H3 Hydraulic Hammer

Page 2 of 2

## BSP H3 POWER PACK

Operating pressure (high)	240 bar
Flow (high)	180 l / min
Engine model	Perkins T6 3544
Engine power	112 kW 150 Bhp
Fuel oil capacity	260 l
Hydraulic oil capacity	345 l
Weight	2600 kg (full)



## **APPENDIX 2: CONSTRUCTION METHODOLOGY SCHEMATICS**



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# PORT CHALMERS CONTAINER WHARF

INSTALLATION OF 13M  
SHEET PILE WALL  
AT FOOT OF WHARF

(B1)

DATE 16-3-15

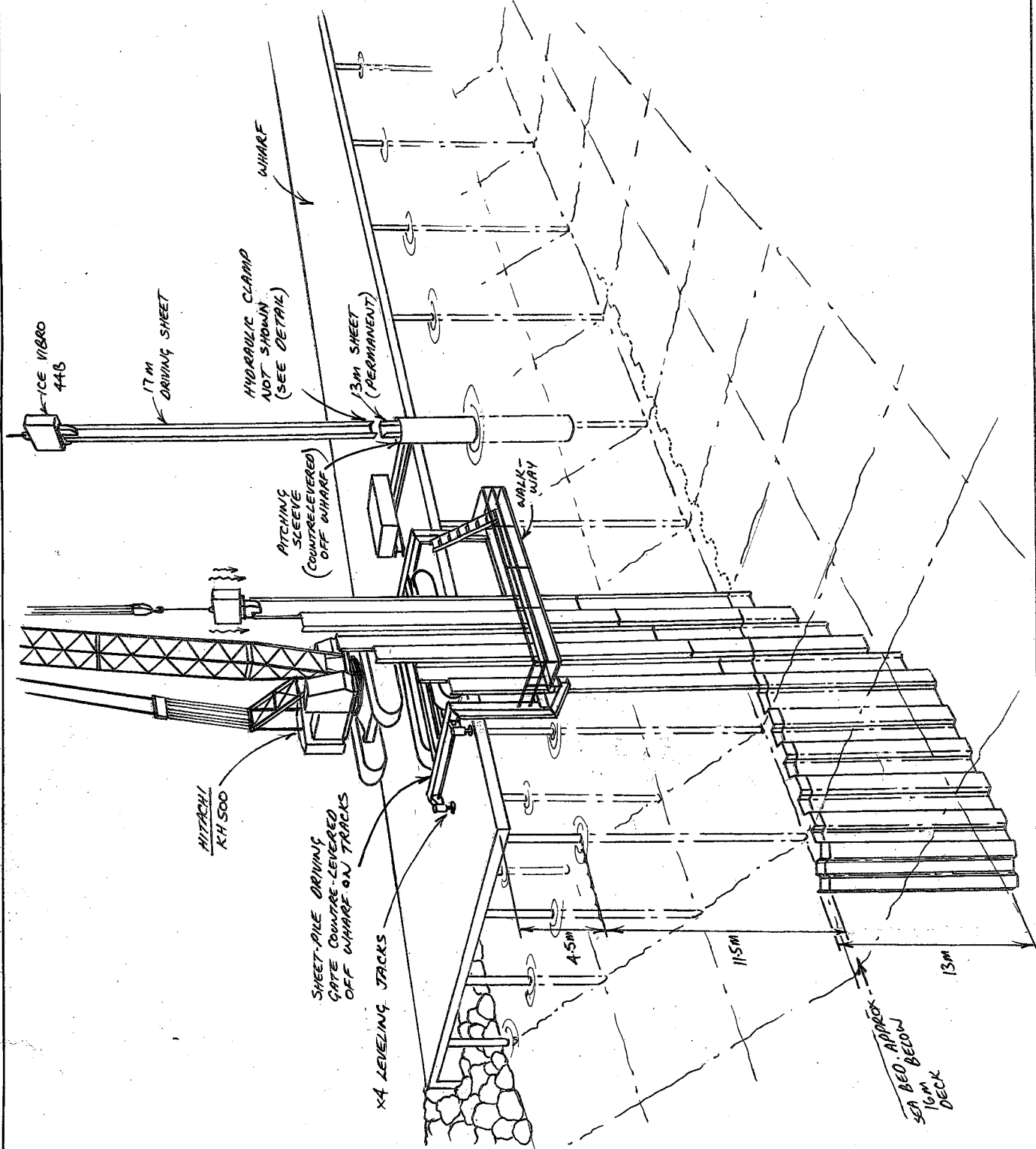
SCALE

DRAWN LUKE COOKE

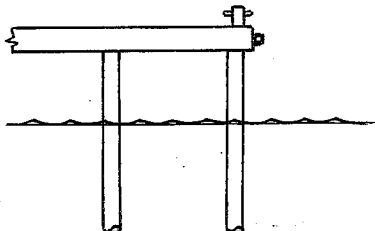
JOB No. PORT CHALMERS

PLAN No.

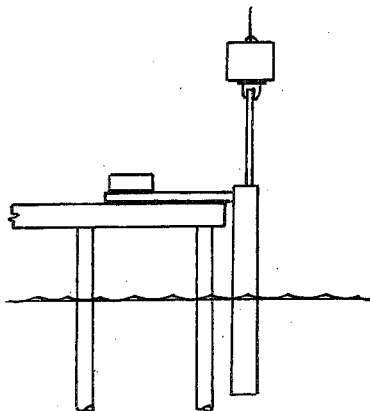
SHEET 1 OF 2 SHEETS



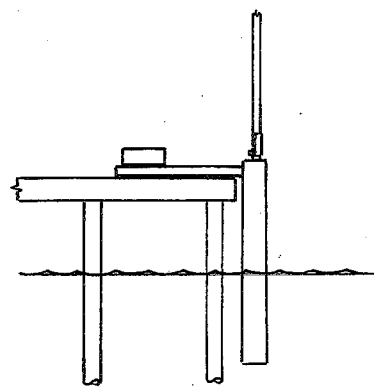
- ① - REMOVE BOLLARDS AND FENDERS  
- POSITION DRIVING GATE AND PITCHING SLEEVE.



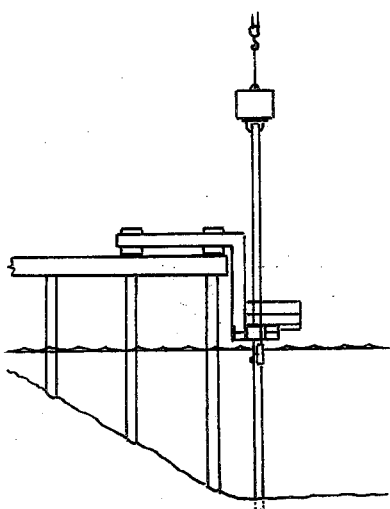
- ② PITCH 17m DRIVE EXTENSION SHEET INTO PITCHING SLEEVE. THEN CLAMP AND LIFT WITH VIBRO JAW ON HITACHI KH500.



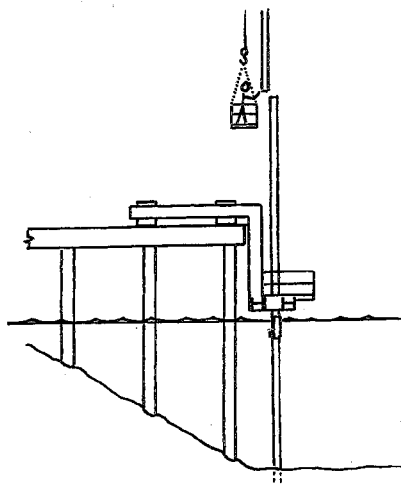
- ③ PITCH 13m SHEET INTO PITCHING SLEEVE WITH AUXILIARY CRANE. THEN CLAMP AND LIFT WITH DRIVE SHEET CLAMP



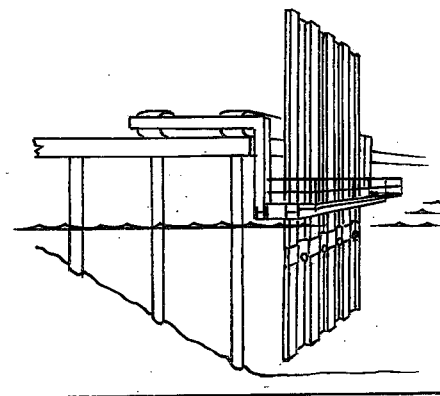
- ④ PITCH SHEET PILE THROUGH GATE INTO POSITION. VIBRO INTO APPROX 3 OR 4m



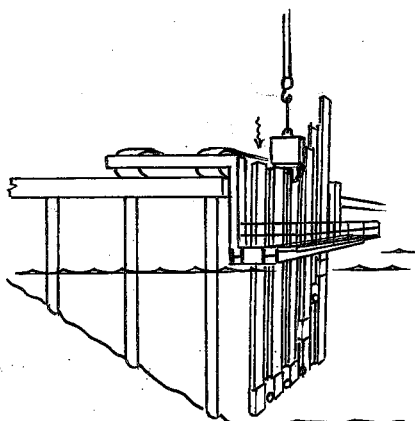
- ⑤ REPEAT STAGES ① AND ②. THEN GUIDE SHEET INTO CLASP OF PREVIOUS SHEET FROM MAN-CAVE OR ACCESS PLATFORM.



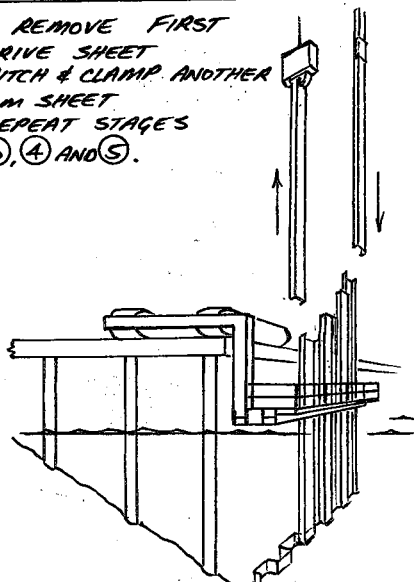
- ⑥ REPEAT PROCESS UNTIL 10 SHEETS ARE PITCH AND PARTIALLY DRIVEN



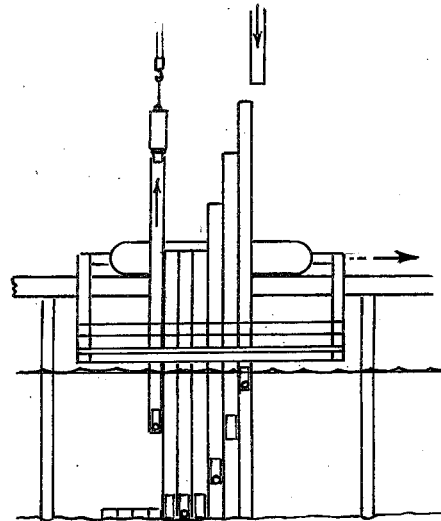
- ⑦ DRIVE FIRST 7 SHEETS TO FULL DEPTH IN STAGES. LEAVE LAST SHEET HIGH



- ⑧ REMOVE FIRST DRIVE SHEET  
- PITCH & CLAMP ANOTHER 13m SHEET  
- REPEAT STAGES ③, ④ AND ⑤.



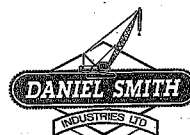
- ⑨ REPOSITION GATE AS SHEET PILE PROGRESSES.



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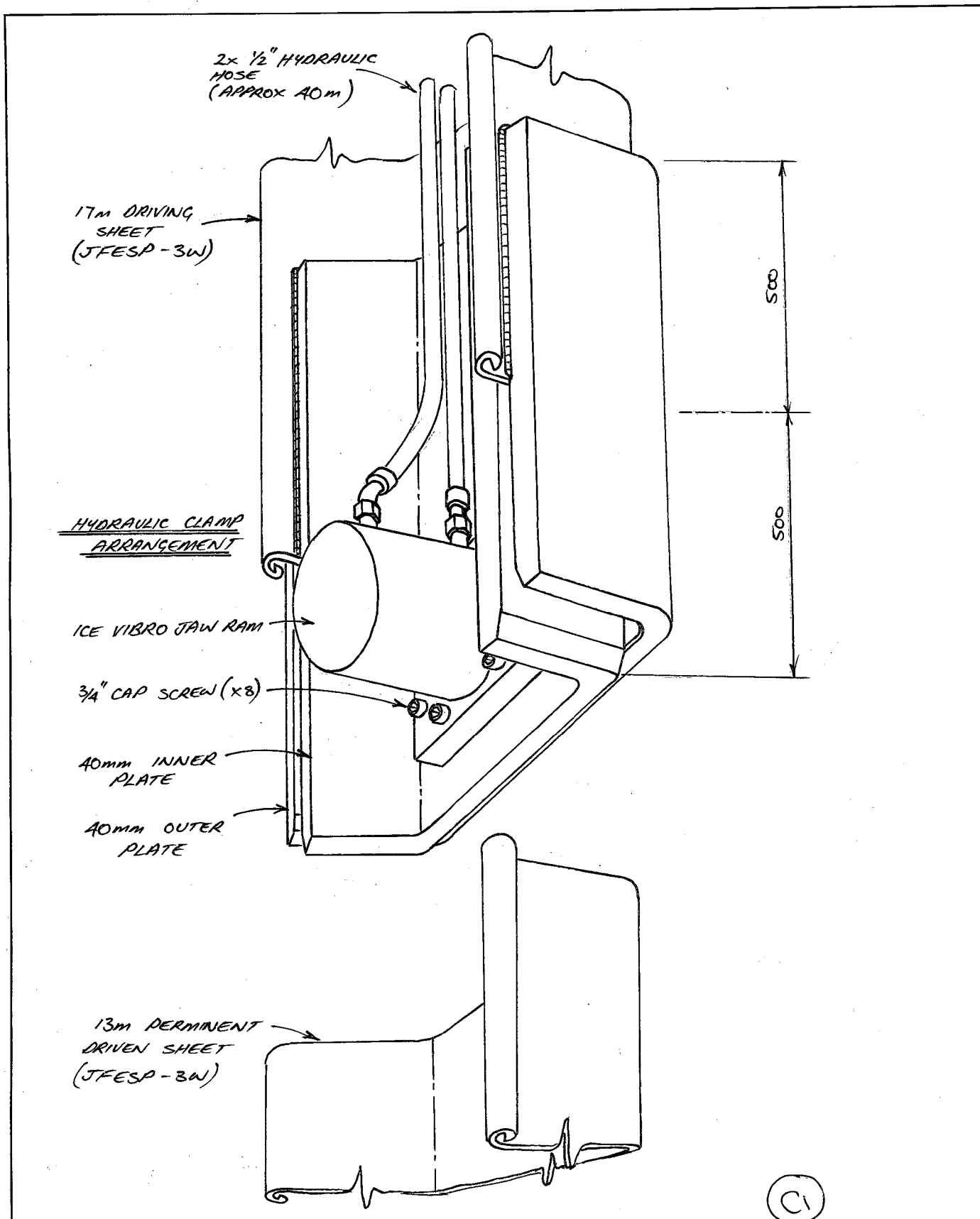
DATE 15-3-15  
SCALE  
DRAWN LUKE COOKE  
JOB No. PORT CHALMERS  
PLAN No. PROCEDURE.  
SHEET OF SHEETS

PORT CHALMERS  
CONTAINER WHARF  
SHEET PILE INSTALLATION  
PROCEDURE.



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B2



Specialising in: Piling and Foundations, Concrete Construction, Heavy Haulage, Plant Hire, Cranage

DATE 17-3-15

SCALE

DRAWN LUKE COOKE

JOB No. PORT CHALMERS

PLAN No.

SHEET 2 OF 2 SHEETS

PORT CHALMERS  
CONTAINER WHARF  
HYDRAULIC CLAMP ARRANGEMENT  
ON 17M DRIVE EXTENSION SHEET



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## **APPENDIX 3: OCTA – CONSTRUCTION PROGRAM**

		Year	Month	Week Beginning Monday	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012	301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## **APPENDIX 4: DANIEL SMITH INDUSTRIES ENVIRONMENTAL POLICY and HYDRAULIC OIL MSDS**



## DANIEL SMITH INDUSTRIES LTD

315 Flaxton Road Rangiora 7400 New Zealand

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Facsimile: +64 (0) 3 313 9904

Mobile: +64 (0) 21 336 623

Email: [daniel@danielsmith.co.nz](mailto:daniel@danielsmith.co.nz)

Website: [www.danielsmithindustries.co.nz](http://www.danielsmithindustries.co.nz)

**Civil Engineering Contractors.**

**Specialising in-**

*Bridges & Marine Structures - Concrete Construction - Piles & Foundations - Heavy Haulage - Plant Hire - Cranage*

## ENVIRONMENTAL POLICIES

**The Resource Management and Environmental Policies of our Company are:**

- To comply with relevant NZ Government and local authorities, NZ Resource Management Act legislation and regulations.
- To establish environmental objectives and targets and designate responsibility for achieving them in a co-ordinated and timely manner.
- To train staff in procedures so that we can encourage acceptance of good practice in relationship to environmental policies.
- To where feasible, reduce waste and the consumption of resources and favour recovery and recycling as opposed to disposal.
- To see that practical steps are taken to have in place a contingency plan for environmental emergencies.
- To obtain approval for any permits or consents required, in a timely and cost effective manner, having regard to the operational needs of our business. To make submissions to announced Plans or Policies of the Local Authorities, for example, water discharge consents.
- To achieve and maintain a good public relations image in relationship to environmental issues and display our policy to the public
- To employ quality and practical persons whom observe and practice environmental care and responsibility.
- To invest in modern reliable equipment and machinery to minimise DSI's exposure to environment risk / incident.
- To employ subcontractors and suppliers of reputable standards whom can comply with the NZ Government environmental requirements and standards.
- To adopt and plan work procedures that minimise environmental risk.

Name: Daniel Smith

Signature: \_\_\_\_\_

**Managing Director**

13 August 2014

Please report any environmental concern, incident, spill or the like to DSI senior management:

Step 1 – Phone call or email to Head Office of Daniel Smith Industries:

Ph. (03) 313 9902

Email: [daniel@danielsmith.co.nz](mailto:daniel@danielsmith.co.nz)

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## PRODUCT SAFETY DATA SHEET

Product :

**AGIP ARNICA S (ISO 46)**

Page : 1/7

Product code : 2580

Version : 2

Date : 19/06/2008

Supersedes SDS dated : 17/01/2002

### 1. Identification of the substance/preparation and of the company

Identification of the substance or

preparation:

AGIP ARNICA S (ISO 46)

Type of product and use:

Hydraulic fluid

Company identification:

ENI S.p.A. - Refining & Marketing Division

Address and telephone Nr.:

Via Laurentina, 449 - 00142 ROMA ITALY  
TEL. (+ 39) 06-59881 FAX (+ 39) 06-59885700

E-mail contact address:

Competent person responsible for the Safety Data Sheet (Reg. EC nr. 1907/2006):  
qualit@eni.it

Reference legislation

This Safety Data Sheet is printed in English, and complies with present European Union regulations. This document does not include information relevant to other countries.

### 2. Hazards identification.

0 - General informations:

Classification of the product:

The product is not classified as dangerous according to the criteria set by the European Union.

1 - Physical-chemical dangers:

Important hazards:

Product with a low risk of fire. It can create flammable mixtures or burn only if heated at temperatures which are higher than normal ambient levels.

2 - Dangers for human health:

Skin contact:

Prolonged and repeated skin contact, especially if hygiene practices are poor, may cause reddening, irritation and dermatitis, due to a defatting effect.

Eye contact:

Contact with eyes may cause reddening and irritation.

Ingestion:

Accidental ingestion of small quantities of the product may cause nausea, discomfort and gastric disturbances. Taking into account the taste and smell of the product, however, ingestion of dangerous quantities is very unlikely.

Inhalation:

This product has a low vapour pressure, and in normal conditions at ambient temperature the concentration in the air is negligible. A significant concentration may build up only if the product is used at high temperature, or in case of sprays and mists.

In these cases overexposure to vapours (e.g. through prolonged use in confined insufficiently ventilated spaces) may cause irritation to airways, nausea and dizziness.

Aspiration of liquid into the lungs:

The aspiration of small amounts of foreign substances into the lungs may cause irritation and inflammation (chemical pneumonia). Taking into account the composition of the product, however, this possibility should be regarded as unlikely.

Other information:

Any substance, in case of accidents involving pressurized circuits and the like, may be accidentally injected under the skin, even without external damage.

# PRODUCT SAFETY DATA SHEET

<b>Product :</b>	<b>AGIP ARNICA S (ISO 46)</b>	Page : 2/7
Product code : 2560	Version : 2	Date : 19/06/2008
		Supersedes SDS dated : 17/01/2002

In such a case, the victim should be brought to an hospital as soon as possible, to get specialized medical treatment.

## 3 - Environmental hazards:

### Important hazards:

This product is not classified as dangerous to the environment, according to the criteria set by the EU.

## 3. Composition/information on ingredients.

Components:	Synthetic base stock. Additives
Hazardous component(s):	None to be reported, according to the present EU regulations.
Other information:	None.

## 4. First aid measures.

Skin contact:	Take off contaminated clothing and shoes. Wash thoroughly with soap and water. If inflammation or irritation persists, seek medical advice.
Eye contact:	Rinse eyes thoroughly for at least 10 minutes. Keep eyelids well apart. If irritation persists, seek medical advice.
Ingestion:	Do not induce vomiting to avoid aspiration into the lungs. If the person is conscious, rinse mouth with water without swallowing. Keep at rest. Call for medical assistance or bring to an hospital.
Inhalation:	In case of disturbances owing to an exposure to a high concentration of vapours or mists, remove the victim from exposure; keep at rest; if necessary, seek medical attention.
Aspiration of liquid into the lungs:	If there is the possibility that the product has been aspired into the lungs (i.e. in case of spontaneous vomiting), transport the victim to a hospital.

## 5. Fire-fighting measures.

General information:	Shut off source of product, if possible. If possible, move containers and drums away from danger area.
Extinguishing media:	
- Suitable:	Small-size fires: carbon dioxide, dry chemicals, foam, sand or earth. Large fires: foam or water fog (mist). These means should be used by trained personnel only.
- Not to be used:	Do not use water jets. They could cause splattering, and spread the fire.
Special protective equipment for firefighters:	Personal protection equipment. Self-contained breathing apparatus
Useful precautions:	Avoid accidental sprays on hot surfaces or electrical contacts. In case of losses from pressurized circuits, the sprays may form mists. Take into account that in this case the lower explosion limit for mists is about 45 g/m <sup>3</sup> air.
Other information:	Use water sprays to cool the surfaces exposed to the flames. Spilled product which is not burning should be covered with sand or foam In case of fire, do not discharge runoff water: collect separately and use a proper treatment.

# PRODUCT SAFETY DATA SHEET

<b>Product :</b>	<b>AGIP ARNICA S (ISO 46)</b>	Page : 3/7
Product code : 2560	Version : 2	Date : 19/06/2008
		Supersedes SDS dated : 17/01/2002

## 6. Accidental release measures.

General measures:	Shut off source of spill, if possible. Eliminate sources of ignition. Do not let the product flow into sewers, water courses or underground spaces. Notify local authorities according to relevant regulations.
Personal precautions:	See Sect. 8 of this sheet.
Methods for cleaning up:	
- Soil:	Contain spilled liquid with sand, earth or other suitable absorbents. Recover free liquid and waste materials in suitable waterproof and oil-resistant containers. Clean contaminated area. Dispose of according to local regulations.
- Water:	Confine the spillage. Remove from surface by skimming or suitable absorbents. Collect recovered product and other waste materials in suitable waterproof, oil resistant containers. Recover or dispose of according to local regulations. Do not use solvents or dispersants.

## 7. Handling and storage.

Storage:	Keep away from sources of ignition. Storage temperature: ambient to 55°C max . Store in a well ventilated place.
Handling:	Store the product in cool, well ventilated surroundings Avoid proximity or contact with hot surfaces, flames or sparks. Avoid contact with skin Do not breathe vapours or mists. Do not smoke. Do not cut, weld, drill, burn or incinerate empty containers or drums, unless they have been cleaned, and declared safe.

## 8. Exposure controls/personal protection.

General indications:	This product has a low vapour pressure, and in normal conditions at ambient temperature the concentration in the air is negligible. A significant concentration may build up only if the product is used at high temperature, or in case of sprays and mists. Avoid the creation of mists or vapours. Aspirators in case of oil mist; protective shields, in case of oil splashes.
8.1 Exposure limit values	
Exposure limits:	For the control of exposure to the product, the most relevant exposure limits are listed here. No TLV-TWA values are reported (A.C.G.I.H. 2007) If necessary, take into account the other limits listed in the relevant workplace regulations, or in the ACGIH documents.
Monitoring procedures:	Refer to relevant legislation and in any case to the good practice of industrial hygiene.
8.2 Control of exposure	
General informations:	In case the concentration of the product or any constituent is above the exposure limits, and if plant characteristics, work procedures and other means are not able to

# PRODUCT SAFETY DATA SHEET

Product :

**AGIP ARNICA S (ISO 46)**

Page : 4/7

Product code : 2560

Version : 2

Date : 19/06/2008

Supersedes SDS dated : 17/01/2002

reach the purpose, it is necessary to use suitable means of personal protection.

Respiratory protection:

Open or well ventilated areas: not necessary.  
Closed or confined areas (e.g. tank interiors): self-contained breathing apparatus.

Personal protection:

Long-sleeved overalls. If necessary, refer to the EN 465-466-467 standards  
When there is a risk of contact with the eyes, use safety goggles or other means of protection. If necessary, refer to national standards or to the EN 166 standard.  
When there is a risk of contact with the skin, use hydrocarbon-resistant, felt-lined gloves.  
Experience shows that gloves made of Nitrile rubber or PVC are adequate for this use.  
Gloves made of PVA (Polyvinylalcohol), Neoprene or natural rubber (latex) have inadequate resistance.  
Use gloves respecting all the conditions and within the limits set by the manufacturer.  
Replace gloves immediately in case of cuts, holes or other signs of damages or degradation.  
If necessary, refer to the EN 374 standard.

Hygiene measures:

Avoid contact with skin and eyes  
Do not breathe vapours or mists.  
Do not clean hands with dirty or oil-soaked rags.  
Do not keep dirty rags in the overall pockets.  
Do not drink, eat or smoke with dirty hands.  
Wash hands with water and soap, do not use solvents or other irritant products which have a defatting effect on the skin.  
Do not re-use clothes, if they are still contaminated.

## 9. Physical and chemical properties (typical values).

Appearance:	Liquid, bright & clear (ASTM D 4176/1).
Odour:	Characteristic.
Colour	Not determined (ASTM D 1500)
Density at 15°C:	920 kg/m <sup>3</sup> (ASTM D 1298).
Boiling point/range:	> 200 °C (at 10 mmHg) (ASTM D 1160)
Vapour pressure:	1·10-3 hPa (20 °C)
Viscosity at 40°C:	46 mm <sup>2</sup> /s (ASTM D 445).
Solubility in water:	Insoluble in water
pH :	Not applicable (ASTM D 1287).
Pour point:	-30 °C. (ASTM D 97)
Flash point :	315 °C. (ASTM D 92)
Auto-ignition temperature:	> 300 °C (DIN 51794)
Explosion limits:	
- Lower:	Not determined.
- Upper:	Not determined.
Partition coefficient (P o/w):	Not determined.

## 10. Stability and reactivity.

Thermal decomposition products:	COx, HC Oxygenated compounds (alcohols, aldehydes)
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54

# PRODUCT SAFETY DATA SHEET

<b>Product :</b>	<b>AGIP ARNICA S (ISO 46)</b>	Page : 5/7
Product code : 2560	Version : 2	Date : 19/06/2008
		Supersedes SDS dated : 17/01/2002

Stability:	Stable product.
Hazardous reactions:	None
Materials to avoid:	Strong oxidants

## 11. Toxicological information.

Oral toxicity (rat):	LD50 greater than 2000 mg/kg (estimated from the composition)
Dermal toxicity (rabbit):	LD50 greater than 2000 mg/kg (estimated from the composition)
Inhalation toxicity (rat):	LC50 greater than 5 mg/l/4h (estimated from the composition)
Skin sensitization:	The product is not classified as a sensitizer according to the criteria set by the EU.
Other information:	<ul style="list-style-type: none"><li>* Not irritating to eyes and skin</li><li>* Minor irritation may occur after prolonged or repeated contact, especially if normal hygienic rules are not respected.</li><li>* None of the components of this product are listed as carcinogen by NTP, IARC, OSHA, EU or others.</li><li>* No components of this product are included in the EU list of dangerous substances (Annex I of Directive 67/548/EEC and its ATP's)</li></ul>

## 12. Ecological information.

General informations:	Handle according to general working hygiene practices to avoid pollution and release into the environment.
Biodegradation:	<p>The most significant constituents of the product should be considered as "readily biodegradable".</p> <p>Biodegradability: &gt; 90 % (28 days) (Based on test with similar products).</p>
Toxicity for aquatic organisms:	<p>This product is not soluble in water. It floats on water and forms a film on the surface. The damage to aquatic organisms is of mechanical kind (immobilization and entrapment)</p> <p>No specific environmental data are available for this product.</p> <p>According to the components, and by comparison with other products of the same type and composition, it is expected that this product has a toxicity for aquatic organisms &gt; 100 mg/l, and must not be regarded as dangerous to the environment.</p>
Other data:	<p>This product has no specific properties for inhibition of bacterial activity.</p> <p>In any case, wastewater containing this product should be treated in plants that are suited for the specific purpose.</p>
WGK class (Germany):	1

## 13. Disposal considerations.

Disposal of product:	Do not dispose of the product, either new or used, by discharging into sewers, tunnels, lakes or water courses. Deliver to a qualified official collector.
European Waste Catalogue Code:	<p>13 02 05 (Ref: 2001/118/CE)</p> <p>This code is only a general indication, and takes into account the original composition of the product and its intended use. The user has the responsibility of choosing the right code, considering the actual use of the product, alterations and contaminations.</p>

# PRODUCT SAFETY DATA SHEET

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<b>Product :</b>	<b>AGIP ARNICA S (ISO 46)</b>	Page : 6/7
Product code : 2560	Version : 2	Date : 19/06/2008
		Supersedes SDS dated : 17/01/2002

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Disposal of packaging:	Dispose of in a safe manner, in accordance with local regulations. Do not cut, weld, drill, burn or incinerate empty containers or drums, unless they have been cleaned, and declared safe.
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## 14. Transport information.

Transport hazard label:	None.
Substance identification number. (UN Nr.):	Not applicable.
RID/ADR:	Does not belong to any class of danger.
ICAO/IATA:	Does not belong to any class of danger.
IMO-IMDG code:	Does not belong to any class of danger.

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## 15. Regulatory information.

EU labelling information:	Not classified under this legislation.
Applicable laws and regulations:	National laws on classification and labeling of dangerous substances/preparations (Adoption of Directive 67/548/CE and subsequent Adaptations to Technical Progress - ATP, and Directive 1999/45/CE). Relevant national laws on health and safety on the workplace. National adoption of Directives 89/391/CEE, 89/654/CEE, 89/655/CEE, 89/656/CEE, 90/269/CEE, 90/270/CEE, 90/394/CEE, 90/679/CEE, 93/88/CEE, 95/63/CE, 97/42/CE, 98/24/CE, 99/38/CE, 99/92/CE, 2001/45/CE, 2003/10/CE, 2003/18/CE. National adoption of Directive 75/439/CEE concerning disposal of used oils. Relevant national laws on recycling and re-use of waste materials. Relevant national laws on prevention of water pollution.

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## 16. Other information.

General indications:	Avoid excessive or improper use.
Other uses of the product:	Do not use the product for any purposes that have not been advised by the manufacturer. In that case, the user could be exposed to unforeseeable dangers.
Document references:	This Safety Data Sheets conforms to the dispositions of Regulation (EC) No 1907/2006.
Text of R-phrases:	Complete text of the R-phrases quoted in this Safety Sheet. These phrases are reported here for information only, and MAY NOT correspond to the classification of the product. None.
Nature of revision:	Correction in Section: 1, 12, 16. Modification according to Regulation (EC) nr. 1907/2006.

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This information relates only to the specific product and may not be valid if the product is used in combination with any other material or in any process.

The informations in this sheet are according to our best knowledge at the date of printing.

# PRODUCT SAFETY DATA SHEET

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**Product :**

**AGIP ARNICA S (ISO 46)**

Page : 7/7

Product code : 2560

Version : 2

Date : 19/06/2008

Supersedes SDS dated : 17/01/2002

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This Safety Data Sheet has been checked and printed on 19/06/2008.

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**End of document.**

**Number of page(s) : 7**

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