

Hilti HIT-HY150 Injection Adhesive

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Customer Hotline

Hong Kong 8228 8118

Macau (Toll free) 00800 - 8228 8118

SAMPLE SUBMISSION AND APPROVAL FORM

Contract Title: _____ _____ Contract No: _____ File Reference: _____	Ref. No.: _____ Date: _____ Ref. No. of Previous Submission: _____ (1) _____ (2) _____
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DETAILS OF SUBMISSION

To: Contract Manager's Representative Attention: _____

From: _____

The enclosed sample and catalogue* / certificate of origin* / technical data* / test report* / job reference* as described below have been checked for compliance with the Specifications and Drawings, and are submitted for approval.

1. General Information

- a. Material Description HIT – HY150 Injection Adhesive

- b. Location: Re-bar fastening

- c. Specification Ref. Page: Item: _____

- d. Drawing Ref. No. _____

- e. B.Q. Ref.No.: _____

- f. Anticipated date of approval: _____

2. Technical Information

The submitted sample has been checked against the specification and drawings as listed below:-

Specification Requirements	Submitted Sample (State details against each item)
a. Brand Not specified	Hilti
b. Country of Origin Not specified	Germany
c. Manufacturer's Name & Address Not specified	Hilti Corporation, FL-9494 Principality of Liechtenstein.
d. Factory's Name & Address(es) Not specified	Hilti GmbH Ind. Ges. F. Befestigungstechnik Hiltistrasse 6, D-86916 Kaufering, Germany.
e. Supplier (with Applicator, if any) Not specified	Hilti (Hong Kong) Ltd

f. Appearance Not specified	According to the sample submitted
g. Color + Not specified	Grey
h. Specification Not specified	Attached
i. Manufacturer's Catalogue Not specified	Attached
j. Test Report (Original/Certificated True Copy) Not specified	Attached
k. Previous Job Reference Not specified	Attached
l. Supplementary Information Not specified	NIL

For and on behalf of the Contractor

(Quality Control Manager)

CONTRACT MANAGER'S COMMENTS	
To:	
From:	Contract Manager's Representative: _____
On the basis of the sample and information given, the above sample submitted is:	
(1) *	Approved.
(2) *	Not approved because _____
Remarks:	_____ _____ _____
Approval does not alter the requirements of the Contract	
Contract Manager's Representative: _____	
_____ Date: _____	

cc. _____

(* Delete if appropriate)
(+ For glass or vitreous mosaic tiles, the contractor is required to confirm the colour range(s) of the submitted sample, i.e. a) light and or medium; or b) dark)

HIT-HY 150 injection adhesive

Base material

- Concrete
- Hard natural stone

Use

- Suitable to achieve high loads in concrete and stone
- For fixing post-installed rebar and anchor rod up to M24
- For fastening the hand rail and fencing
- For repair mortar

Material

- 2-component ready mix methacrylate resin (styrene-free)

Approvals: (Rebar)



Curing time

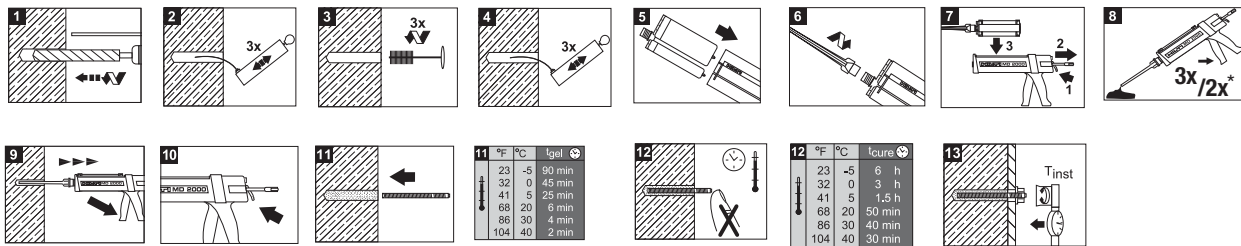
Temperature of the base material	Working time	Curing time
40°C	2 min.	30 min.
30°C	4 min.	40 min.
20°C	6 min.	50 min.
5°C	25 min	90 min.
0°C	45 min	3 hours
-5°C	90 min	6 hours



Benefits

- For fastenings without expansion pressure
- User-friendly and odourless (styrene-free)
- Fast curing resin to increase the productivity
- Foil pack design reduces disposal cost
- With NSF and WRAS approvals for use in contact with drinking water

Installation procedures



* Throw away first two trigger pulls for 330 ml cartridge, three trigger pulls for 500 ml cartridge.

HIT-HY150 programme

Description	Including	Content (ml)	Package (pcs)	Ordering designation	Item no.
HIT-HY 150	2 mixers	500	20	FOIL PACK HY150/500/2	338973
HIT-HY 150	2 mixers	330	20	FOIL PACK HY150/330/2	315959
HIT-M mixer			100	HIT-M mixer	68156

HIT-HY 150 with HAS-E anchor rod

Material

- Steel strength grade 5.8 for M8 to M24 galvanized at least 5µm
- Steel strength grade 5.8 for M8 to M24, hot dip galv. to 45µm
- A4-70 stainless steel (M8-M24)
- High corrosion resistance (HCR) (M8-M24)
- A5-80 stainless steel (on request)

Technical data

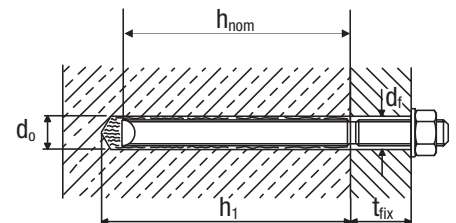
Recommended load, F_{30} (kN), non-cracked concrete at 30N/mm², safety factor(γ)=3

Model	Size	M8	M10	M12	M16	M20	M24
HIT-HY 150 + HAS-E / -EF	Tensile Load, N_{rec}	5.7	8.7	12.7	18.8	30.3	42.2
	Shear Load, V_{rec}	2.8	4.3	6.3	12.0	18.7	26.7
HIT-HY 150 + HAS-ER / -HCR	Tensile Load, N_{rec}	7.7	12.3	17.7	18.8	30.3	42.2
	Shear Load, V_{rec}	4.0	6.3	9.0	17.0	26.3	37.3

Remarks:

- 1) All the data applies to no edge distance, spacing and other influences
- 2) For detail design method, please refer to Fastening Technology Manual

Approvals: (Thread Rod)



10

ED 3500 electrical dispenser Powerful and effortless mortar injection.

Application

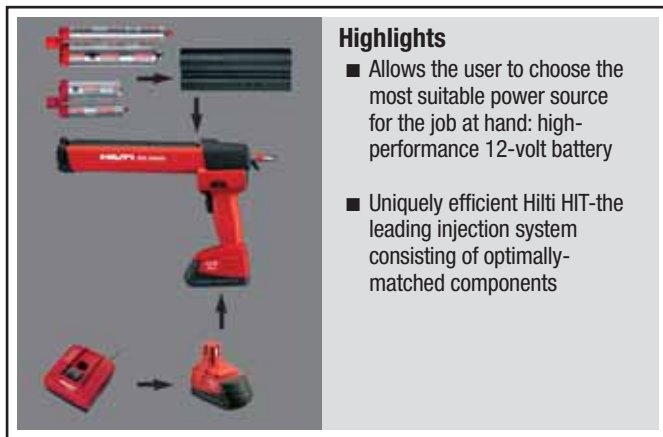
- Injection of Hilti HIT adhesive mortar for fastening anchor rods and rebars in concrete, masonry and stone

Technical data

ED 3500 dispenser

Dispensing time*	70 sec
Dispenser piston force	3000 N
Battery capacity:	
SFB 121 (12 V, 2.0 Ah NiCd)	50 foil packs*
SFB 126 (12 V, 3.0 Ah NiMH)	75 foil packs*

* 500 ml foil pack HIT-RE 500 with mixing nozzle at 20°C



Highlights

- Allows the user to choose the most suitable power source for the job at hand: high-performance 12-volt battery
- Uniquely efficient Hilti HIT-the leading injection system consisting of optimally-matched components

Benefits

- Ideal for working in difficult to reach locations as well as for repetitive, heavy use
- Less tiring to use - allows mortar to be dispensed more quickly for significantly higher productivity
- Effortless injection even at low temperatures and in deep holes
- Compatible with existing Hilti 12-volt batteries and chargers
- Allows the user to choose the most suitable power source for the job at on hand: high-performance 12-volt battery

Ordering designation

ED 3500 dispenser kit

Dispenser, 2 cartridge holders, C7/24 charger, SFB 121 battery, 3 round brushes, blow-out pump, protective goggles, supplied in an impact-resistant Hilti toolbox

Item no.

273294

ED 3500 dispenser basic kit

Dispenser, 2 cartridge holders, 3 round brushes, blow-out pump, protective goggles, supplied in an impact-resistant Hilti toolbox

273295 ★

ED 3500 dispenser

Dispenser, cartridge holders, protective goggles, supplied in a cardboard box

273291



HIT system

Basic set the Hilti HIT system, as a basic set, in a practical plastic case, clearly arranged and always at hand

Description	Package	Ordering designation	Item no.
ED 3500 dispenser kit ①	1		273294
Dispenser, 2 cartridge holders, C7/24 charger, SFB 121 battery, 3 round brushes, blow-out pump, protective goggles, supplied in an impact-resistant Hilti toolbox			
ED 3500 dispenser ②	1		273291
Dispenser, cartridge holders, protective goggles, supplied in a cardboard box			
Tool kit MD2500 (500ml) ③	1	Tool kit MD2500	369220
(content: case, dispenser, 2 foil pack holders, blow-out pump, brushes dia. 13, 18 & 28mm and protective google)			
MD2500 Dispenser (500 ml) ④	1	MD2500	338853
incl. 1 foil pack holder			
MD2500 Foil pack holder (500 ml) ⑤	1	Holder 3:1	339477
Tool kit MD2000 (330ml) ③	1	Tool kit MD2000	229155
(content: case, dispenser, 2 foil pack holders, blow-out pump, brushes dia. 13, 18 & 28mm and protective google)			
MD2000 Dispenser (330ml) ④	1	MD2000	229154
incl. 1 foil pack holder			
MD2000 Foil pack holder (330ml) ⑤	1	Holder 3:1	229170
Blow out pump ⑥	1	Blow out pump	60579
Brush with grip dia 13mm ⑦	1	Brush dia 13mm HG	229133 ★
Brush with grip dia 18mm ⑦	1	Brush dia 18mm HG	229134 ★
Brush with grip dia 28mm ⑦	1	Brush dia 28mm HG	229135 ★
Brush with GA dia 18mm* ⑧	1	Brush dia 18mm GA	229136 ★
Brush with GA dia 28mm* ⑧	1	Brush dia 28mm GA	229137 ★
Brush with GA dia 38mm* ⑧	1	Brush dia 38mm GA	229673 ★
Brush with GA dia 50mm* ⑧	1	Brush dia 50mm GA	229674 ★
Brush extension with GA* ⑨	1	Brush extension	229138 ★
Brush adapter (middle section)* ⑩	1	Brush adapter piece	238727 ★

*GA= thread connection

Accessories for overhead application

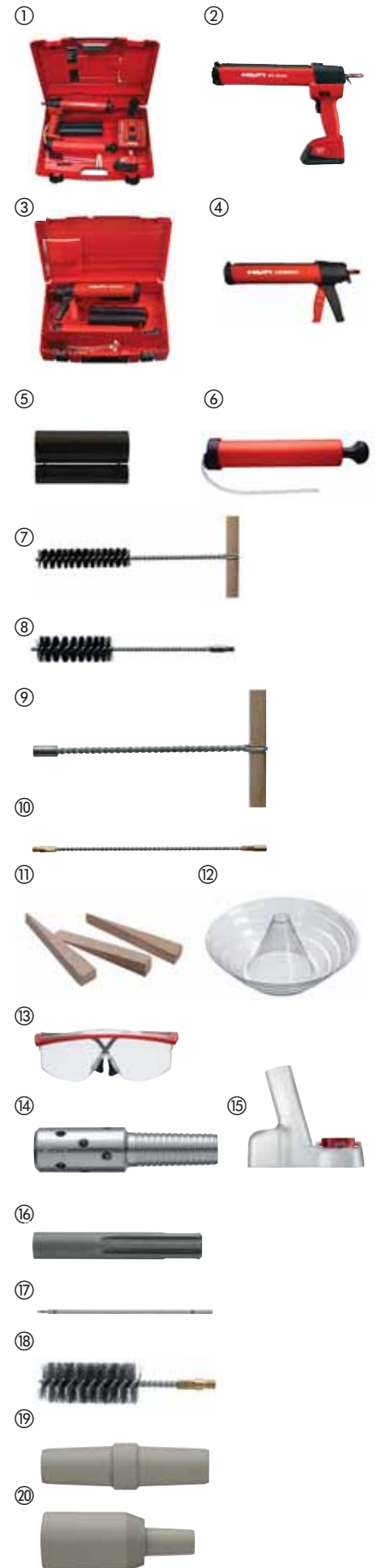
Description	Package	Ordering designation	Item no.
Overhead wedge ⑪	100	HIT-OHW	387550
Overhead cup (ø8-20mm)# ⑫	10	HIT-OHC 1	387551
Overhead cup (ø20mm above)# ⑫	10	HIT-OHC 2	387552

#Rebar or thread rod diameter

Accessories for long embedment application

Description	Package	Ordering designation	Item no.
Protective goggles ⑬	1	HIT	005205
Air nozzle (dia.20mm) ⑭	1	HIT-DL 20	371719 ★
Air nozzle (dia.24mm) ⑭	1	HIT-DL 25	371720 ★
Air nozzle (dia.32mm) ⑭	1	HIT-DL 32	371721 ★
Dust removal system ⑮	1	HIT-DRS	362323 ★
Holder for brush extension RBS ⑯	1	TE-Y	263439 ★
Holder for brush extension RBS ⑯	1	TE-C	263437 ★
Bursh extension for round steel brush (0.7m length) ⑰	1	HIT-RBS 10/0.7	336645 ★
Round steel brush (dia. 20mm) ⑱	1	HIT-RB 20	336552 ★
Round steel brush (dia. 25mm) ⑱	1	HIT-RB 25	336553 ★
Round steel brush (dia. 30mm) ⑱	1	HIT-RB 30	380920 ★
Round steel brush (dia. 40mm) ⑱	1	HIT-RB 40	382260 ★
Round steel brush (dia. 47mm) ⑱	1	HIT-RB 47	382264 ★
Coupler for injection extensions ⑲	1	HIT-VL K	335021 ★
Piston Plug (dia. 20mm) ⑳	1	HIT-SZ 20	335026 ★
Piston Plug (dia. 25mm) ⑳	1	HIT-SZ 25	335027 ★
Piston Plug (dia. 30mm) ⑳	1	HIT-SZ 30	380925 ★
Piston Plug (dia. 40mm) ⑳	1	HIT-SZ 40	380927 ★
Piston Plug (dia. 47mm) ⑳	1	HIT-SZ 47	380930 ★

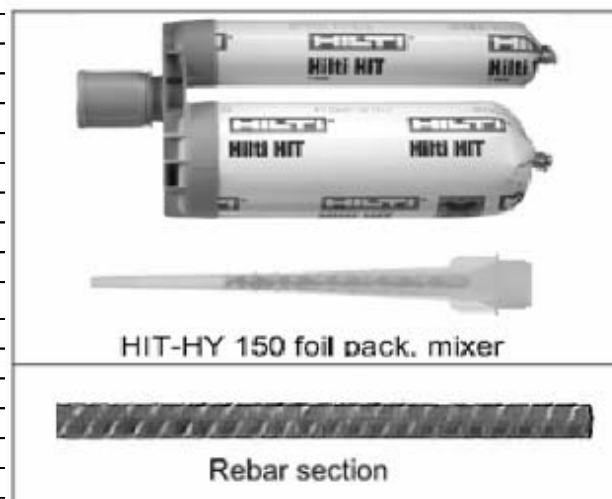
★ Special Request



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HIT HY150 Injection Adhesive with Rebar

Features:	base material: concrete
	two-component hybrid mortar
	rapid curing
	no expansion force in base material
	high loading capacity
	small edge distance and anchor spacing
	clean and simple application
	odourless mortar
Material:	
Rebar:	Steel grade f_{yk} : 460N/mm ²
	Foil pack: 500ml
Cartridge:	Foil pack: 330ml (special request)
	Jumbo cartridge: 1100ml (special request)
Dispenser:	MD2500 and P3500F (for 500ml package)
	MD2000, BD2500 and P3000F (for 330ml package)
	P5000HY (for 1100ml package)

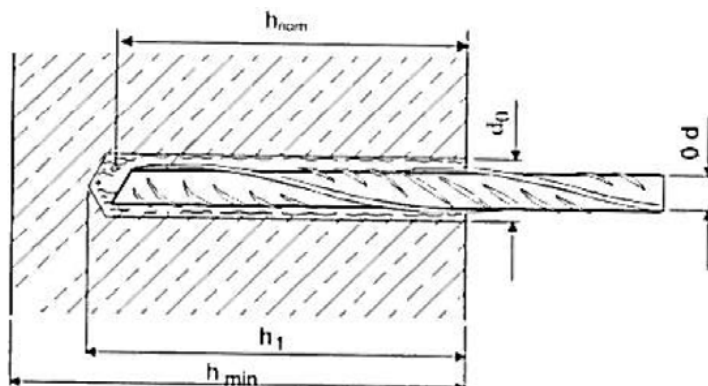


Basic loading data & Installation Details

	Y10	Y12	Y16	Y20	Y25	Y32	Y40
Rebar diameter (mm) [Ød]	10	12	16	20	25	32	40
Hole diameter (mm) [d0]	14	16	22	28	32	40	48
Embedment Depth (mm) [h1]	100	120	160	300	375	480	600
Ultimate mean pull-out load as per BS5080 Part 1 (kN)	48.3	63.6	98.7	170.4	212.8	434.5	532.0
Yield load of rebar (kN)	36.1	52.0	92.5	144.5	225.8	369.9	578.0
Installation system							
Drill bit	TE-CX14	TE-CX16	TE-CX22	TE-CX28	TE-YX32	TE-YX40	-
Drilling system	TE6 / TE16 / TE35				TE56 / TE76 ATC		
Core bit	DD-C14	DD-C16	DD-C22	DD-C28	DD-B32	DD-B40	DD-B48
Diamond core system	DD-EC1				DD 130		

Remarks:

- It is based on non-cracked concrete with strength 30N/mm²;
- Yield strength of rebar f_{yk} is 460N/mm²;
- **There is no factor of safety introduced in the ultimate mean pull out load. Please apply appropriate factor of safety in your design;**
- All the spacing and edge distance requirement for reinforced concrete design should be reference to BS8110;
- For rebar diameter greater than 25mm, HIT RE500 is recommended to use.
- All the above data is tested by using hammer drilled holes.
- All the drilled holes must be cleaned using brushes and air pump.
- **If there is a fire resistance concern, the loading should be referred to the tables on page 35 & 36;**



Consumption Table

Rebar Size ϕ	Hole Diameter D [mm]	Hole Depth I [mm]	Filled Volume V [ml]
Y10	14	100	7.5
Y12	16	120	10.6
Y16	22	160	28.6
Y20	28	300	90.4
Y25	32	375	117.5
Y32	40	480	217.0
Y40	48	600	331.6

Remark:

- 1) The filled volume was calculated by the following equation and is for reference only.

$$\text{Filled volume} = [(D/2)^2 - (R/2)^2] \times 3.14 \times I$$
 where D = hole diameter, I = hole depth, R = rebar diameter
- 2) The filled volume showed in the table did not include any wastage during the installation.
- 3) 1 trigger pull of dispenser MD2500 is approx. 8ml of HY150. To dispense 1 cartridge of 500ml HY150 needs approx. 63 triggers.

Mechanical Properties

Property	Standard	Value
Compressive Strength	DIN53454	51.1 N/mm ²
Modulus of elasticity (Binding test)	DIN53452	3500 N/mm ²
Bending / Flexural Strength	DIN 53452	19.5 N/mm ²

Hilti Injection Technique HIT HY150 + Rebar

Material : Rebar

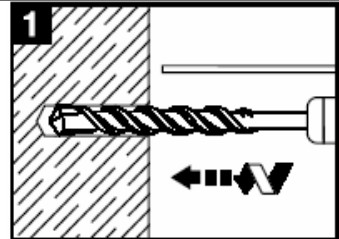
Mortar cartridge : HIT HY150 (500ml packing)

Dispenser : HIT MD2500, HIT P3500F,

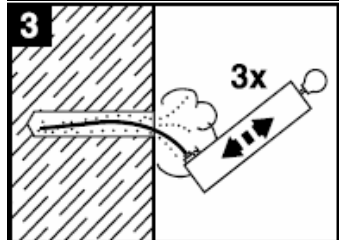
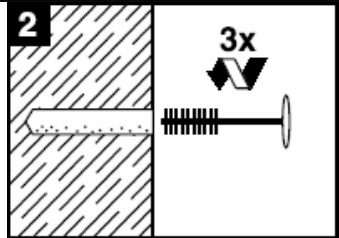
Reference : Hilti Fastening Technical Manual or Product Catalogue

Setting Operation:

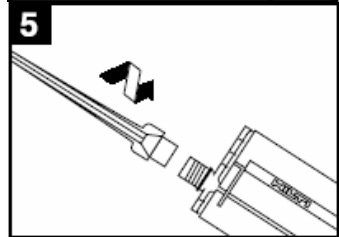
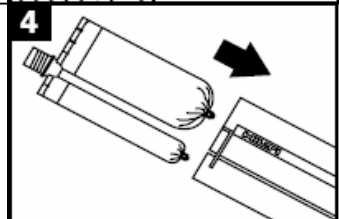
1. Drill the hole with dimension according to the installation details.



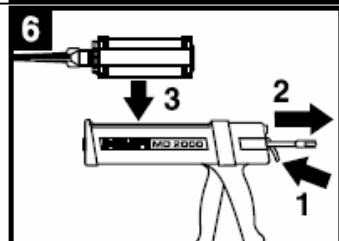
2. Clean the drilled hole thoroughly by using the tool kit (blow-pump & brushes). The hole should be free from water, or otherwise, the ultimate load will be reduced.



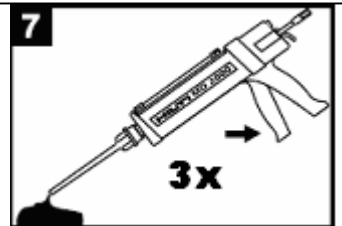
3. Open the cartridge cap, insert it into the holder and screw the mixer on it.



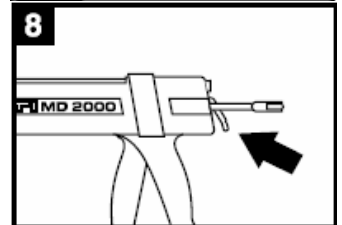
4. Put the cartridge into the dispenser.



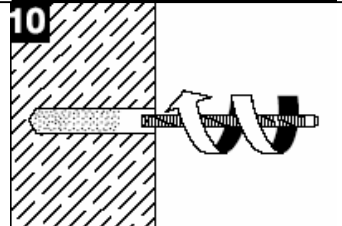
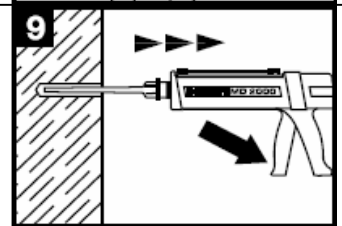
5. Throw away (must) first 3 trigger pulls. Release dispenser to stop the grout flowing.



6. Insert the mixer head to the bottom of the hole and inject the mortar from bottom to the top of the hole. (Approx. 2/3 of the hole depth).

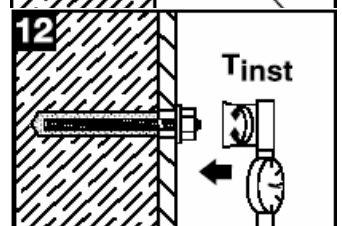
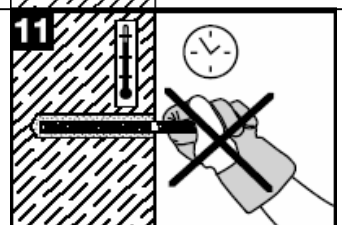


7. Insert the rebar slowly by turning it into the mortar up to the required depth.



8. Fix the workpiece after the grout is cured.

Base material temperature	Working time or gel time	Curing time
(°C)	t_{work}/t_{gel}	t_{cure}
-5	90min	6h
0	45min	3h
5	25min	1.5h
20	6min	50min
30	4min	40min
40	2min	30min





Re-bar Tests - Pullout Test for HILTI HIT - HY 150

Client : Hilti (Hong Kong) Ltd.
Unit 3, 5/F, Harbour Centre, Tower 2
8 Hok Cheung Street
Hung Hom, Kowloon

Order : As per telefax dated January 23, 1995
Date tested : February 15, 1995 to March 9, 1995

- Testing method :
- Each test specimen was prepared from concrete cube. Five cubes were cast for each size of re-bar and for each depth of embedment.
 - A hole was drilled in each specimen in accordance with the guideline/requirement set by the manufacturer and B.S. 5080 Part 1. The re-bar was then installed by Client.
 - The installed re-bar was tested to failure in accordance with B.S. 5080 Part 1.

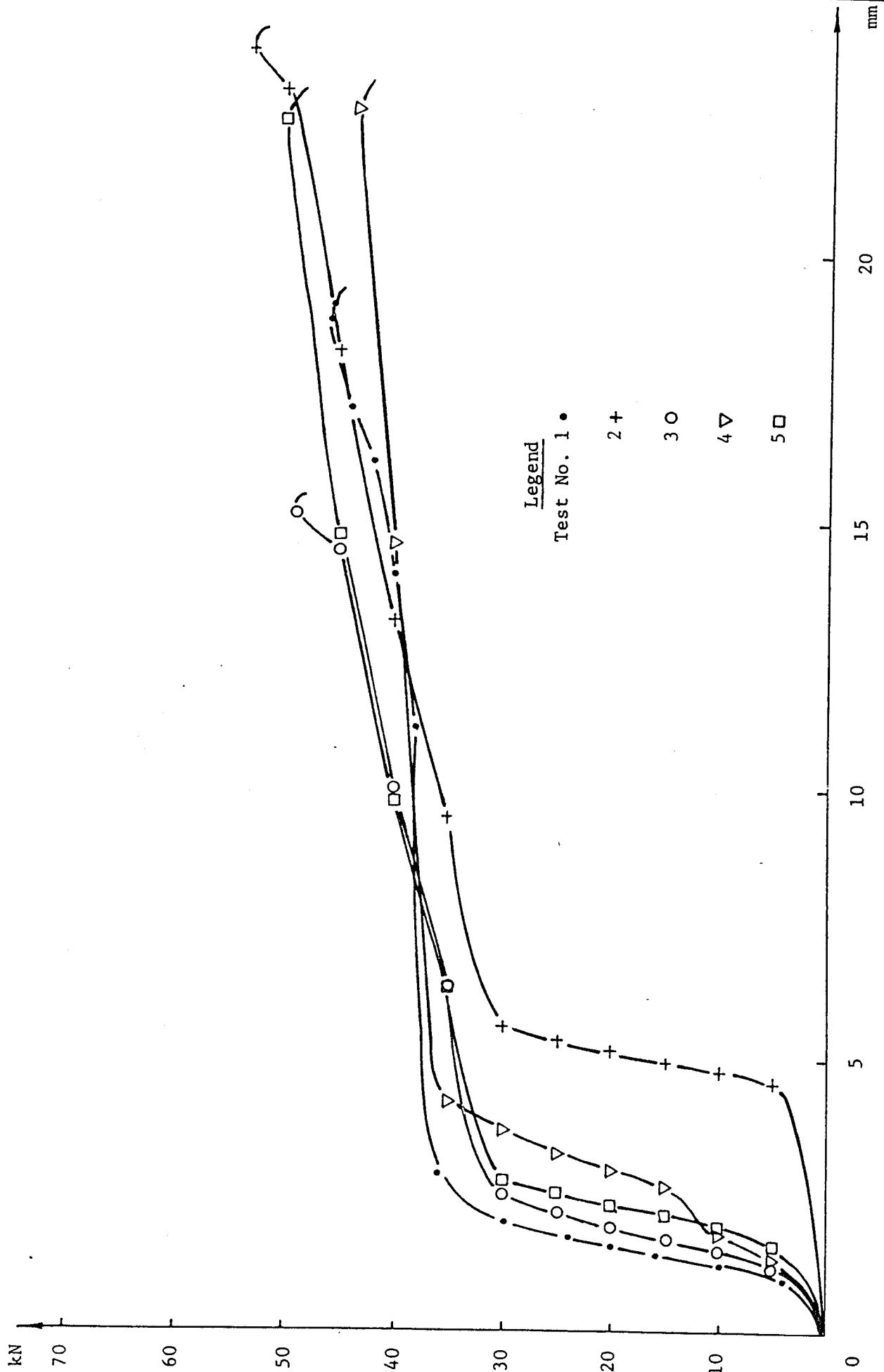
Results:-

Re-bar size-embedment	Ultimate load (kN)					Average value	Standard deviation	Concrete cube size (mm)	Concrete cube strength (MPa)	Mode of failure
	Specimen									
	1	2	3	4	5					
Y10 x 100	46.0	53.0	49.0*	43.5	50.0	48.3	3.7	200x200x200	34.5	Slippage between fixings and the predrilled holes
Y10 x 150	48.0	53.0	58.0	46.0	55.0	52.0	4.9	200x200x200	34.5	Slippage between fixings and the predrilled holes
Y12 x 120	60.0*	73.0	63.0	55.0*	67.0	63.6	6.8	200x200x250	34.5	Slippage between fixings and the predrilled holes
Y12 x 180	63.5	69.0	67.0	69.5	62.0	66.2	3.3	200x200x250	34.5	Slippage between fixings and the predrilled holes
Y16 x 160	102.0	91.0	100.0	103.5	97.0	98.7	4.9	200x200x250	34.5	Cracking in base material
Y16 x 240	147.0	146.0	144.0	140.0#	144.0	144.2	2.7	250x250x400	34.5	Cracking in base material
Y20 x 200	122.0#	138.0	147.0#	121.0	137.0	133.0	11.2	300x300x400	34.5	Cracking in base material
Y20 x 300	172.0#	154.0#	194.0	137.0	195.0	170.4	26.0	300x300x400	34.5	Cracking in base material
Y25 x 250	149.0	131.0	128.0	146.5	150.5	141.0	10.6	300x300x400	34.5	Cracking in base material
Y25 x 375	206.0	217.0	217.0#	220.0	204.0	212.8	7.3	300x300x400	34.5	Cracking in base material

* Failure mode - cracking in base material.

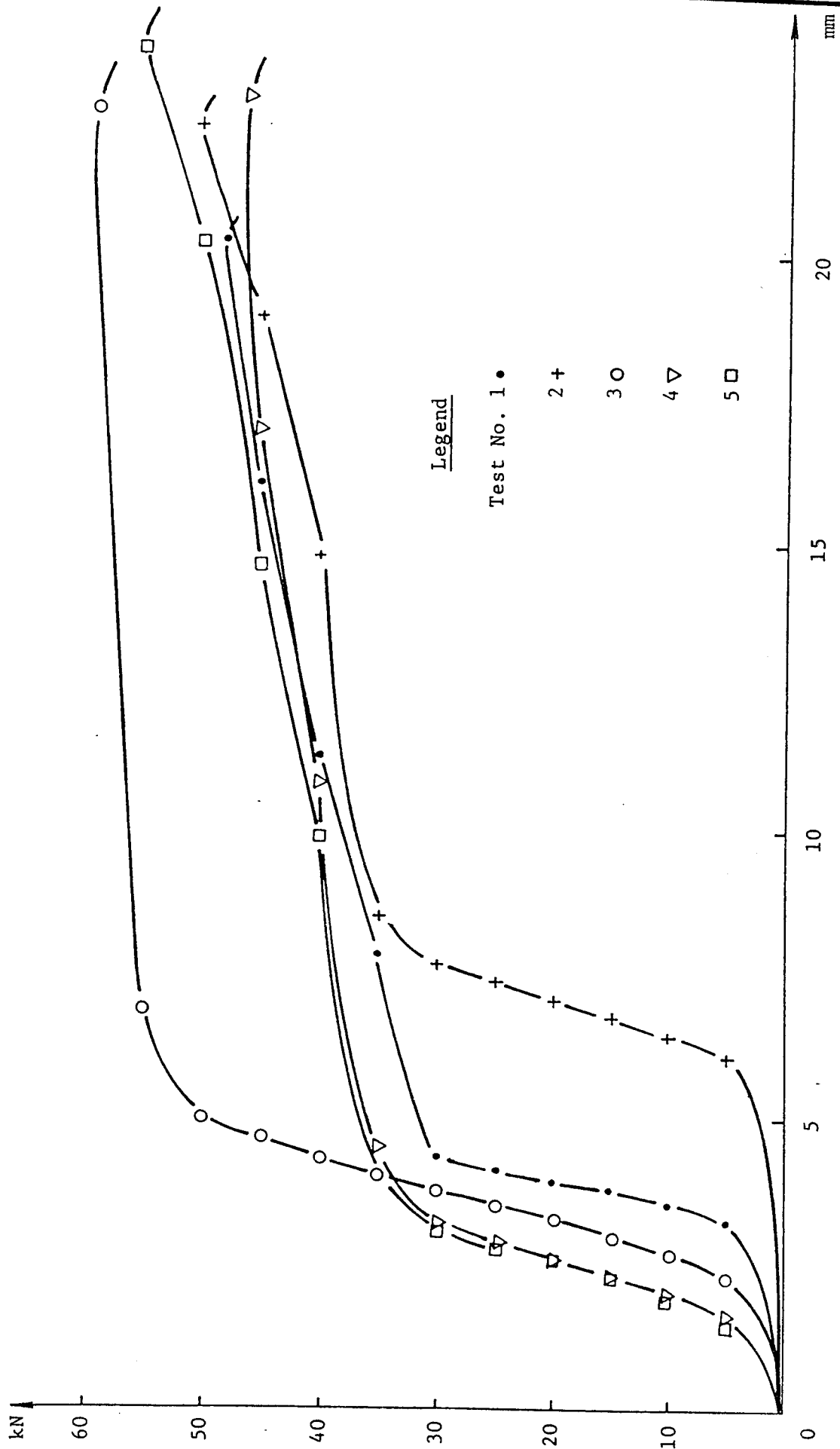
Failure mode - slippage between fixings and the predrilled hole(s).

Certified by:
Professor Y.K. Cheung
Chief Executive



Legend
 Test No. 1 •
 2 +
 3 ○
 4 ▽
 5 □

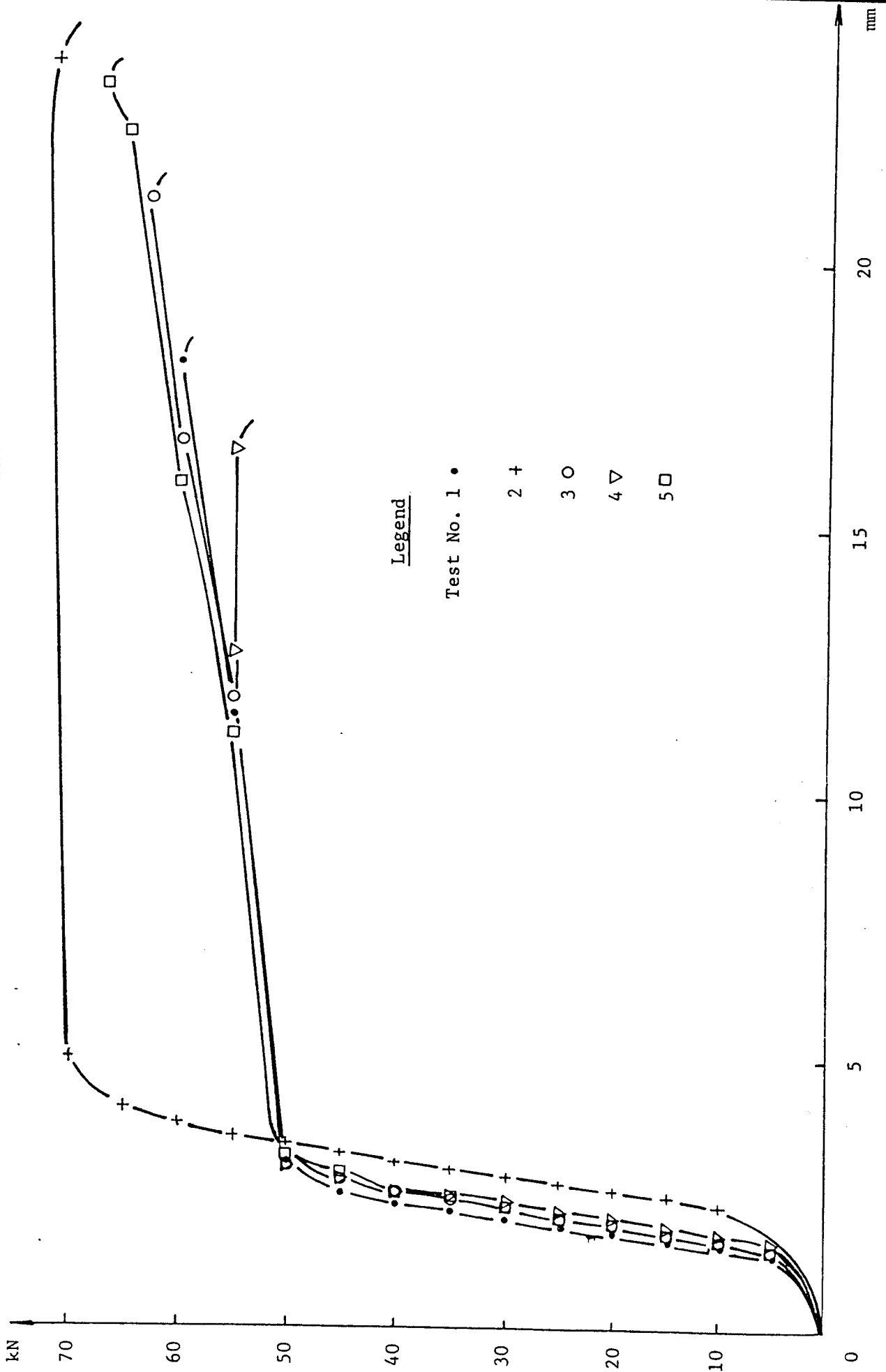
Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y10 x 100



Legend

- Test No. 1 •
- 2 +
- 3 ○
- 4 ▽
- 5 □

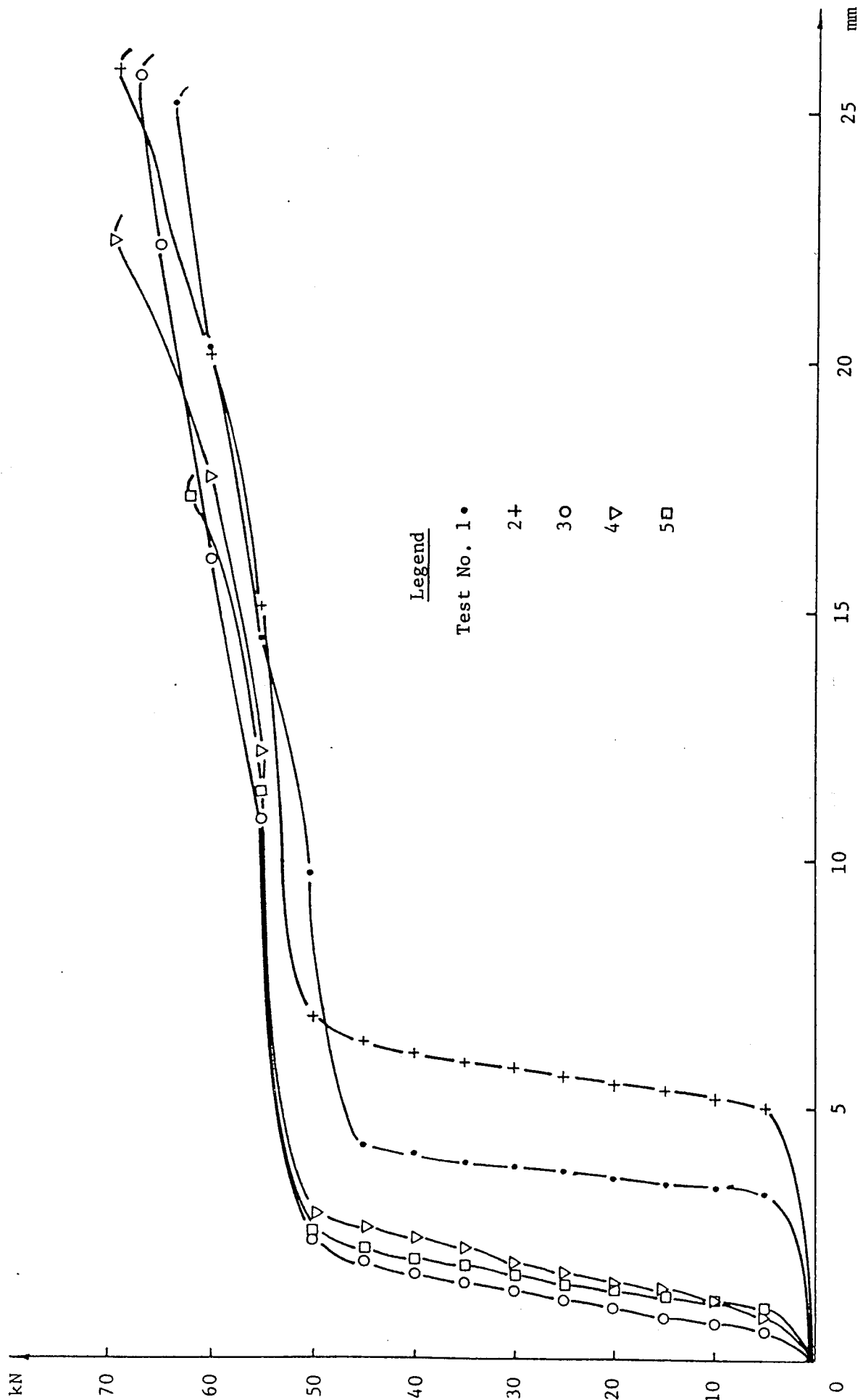
Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y10 x 150



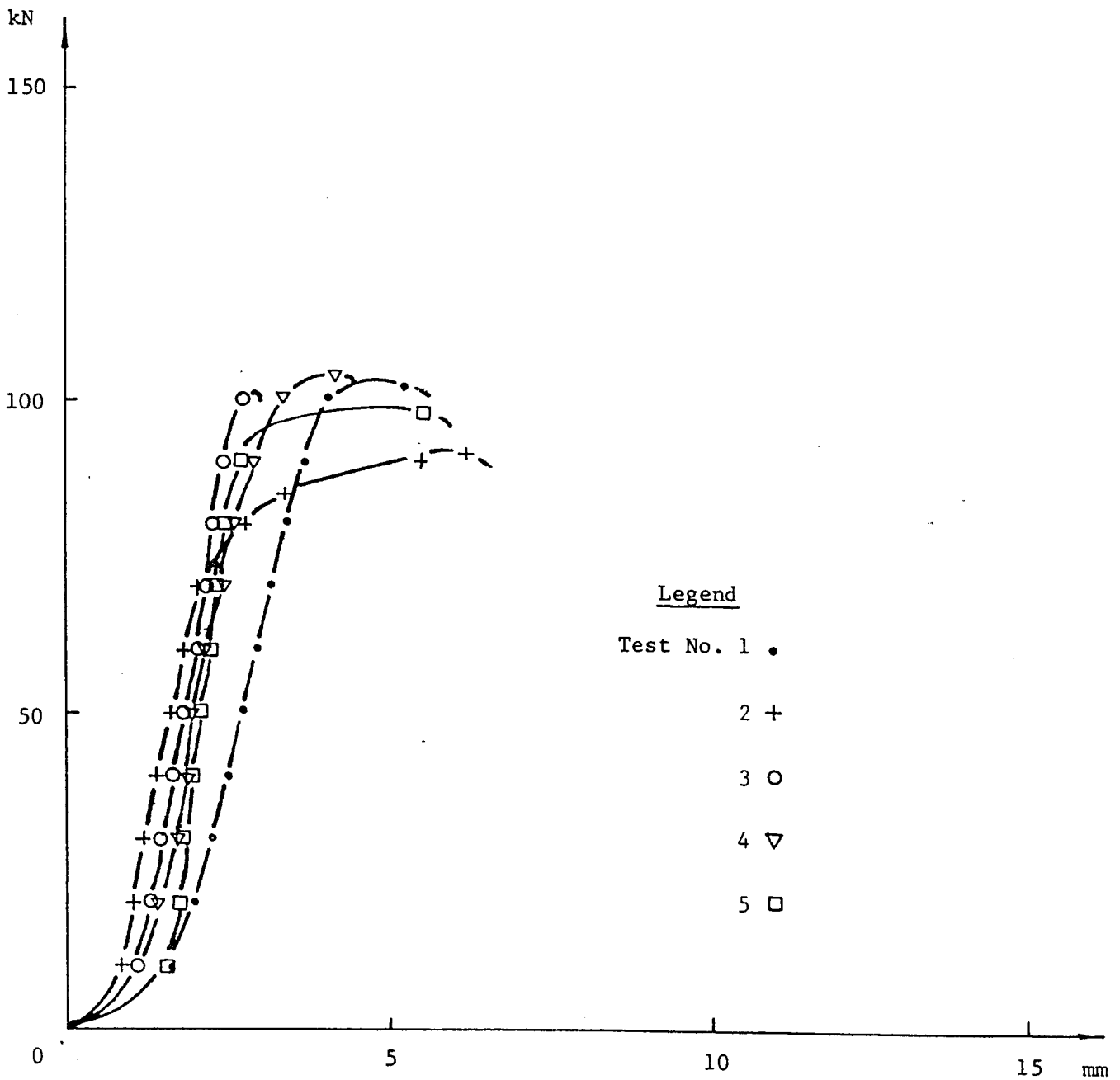
Legend

- Test No. 1 •
- 2 +
- 3 o
- 4 v
- 5 □

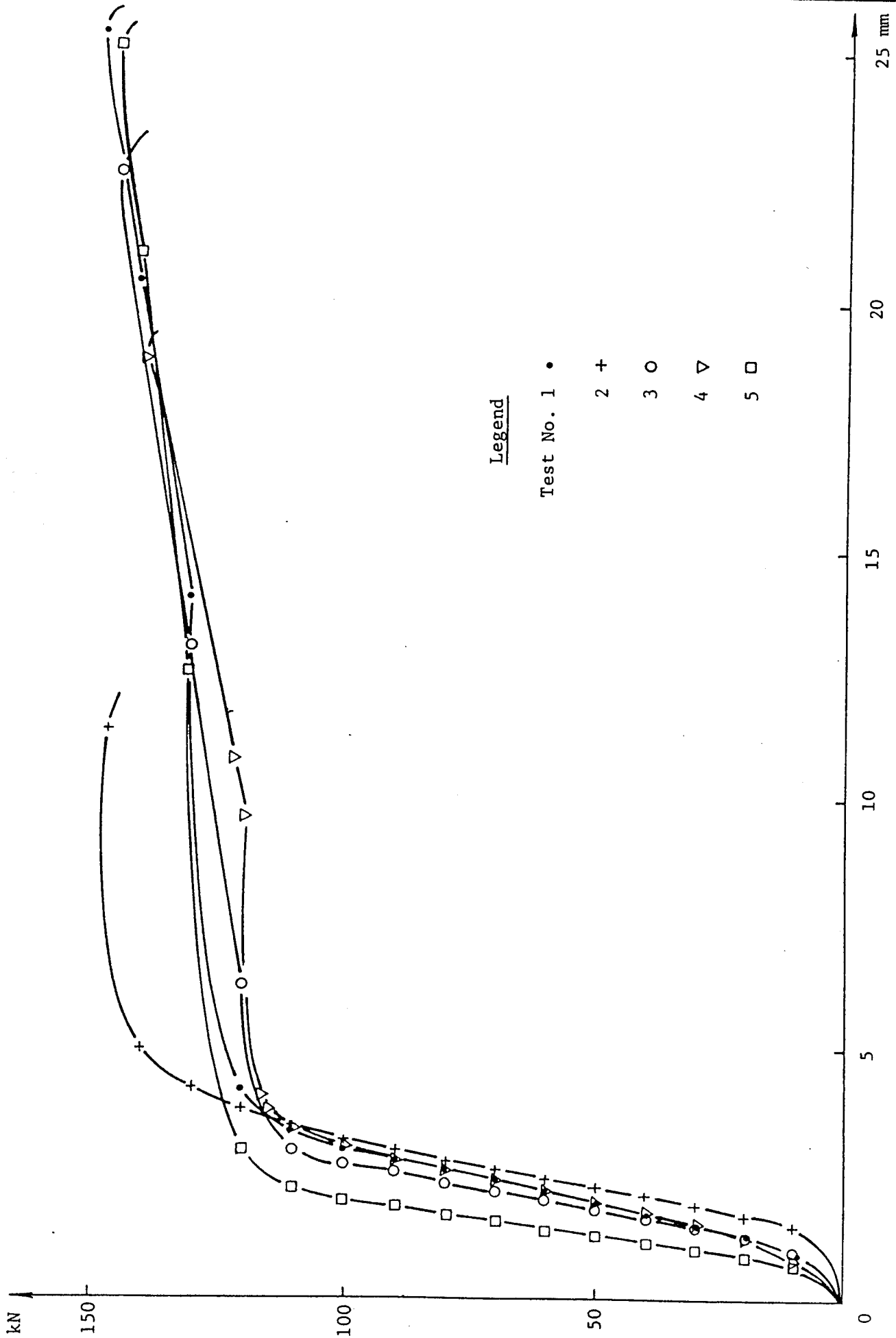
Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y12 x 120



Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y12 x 180



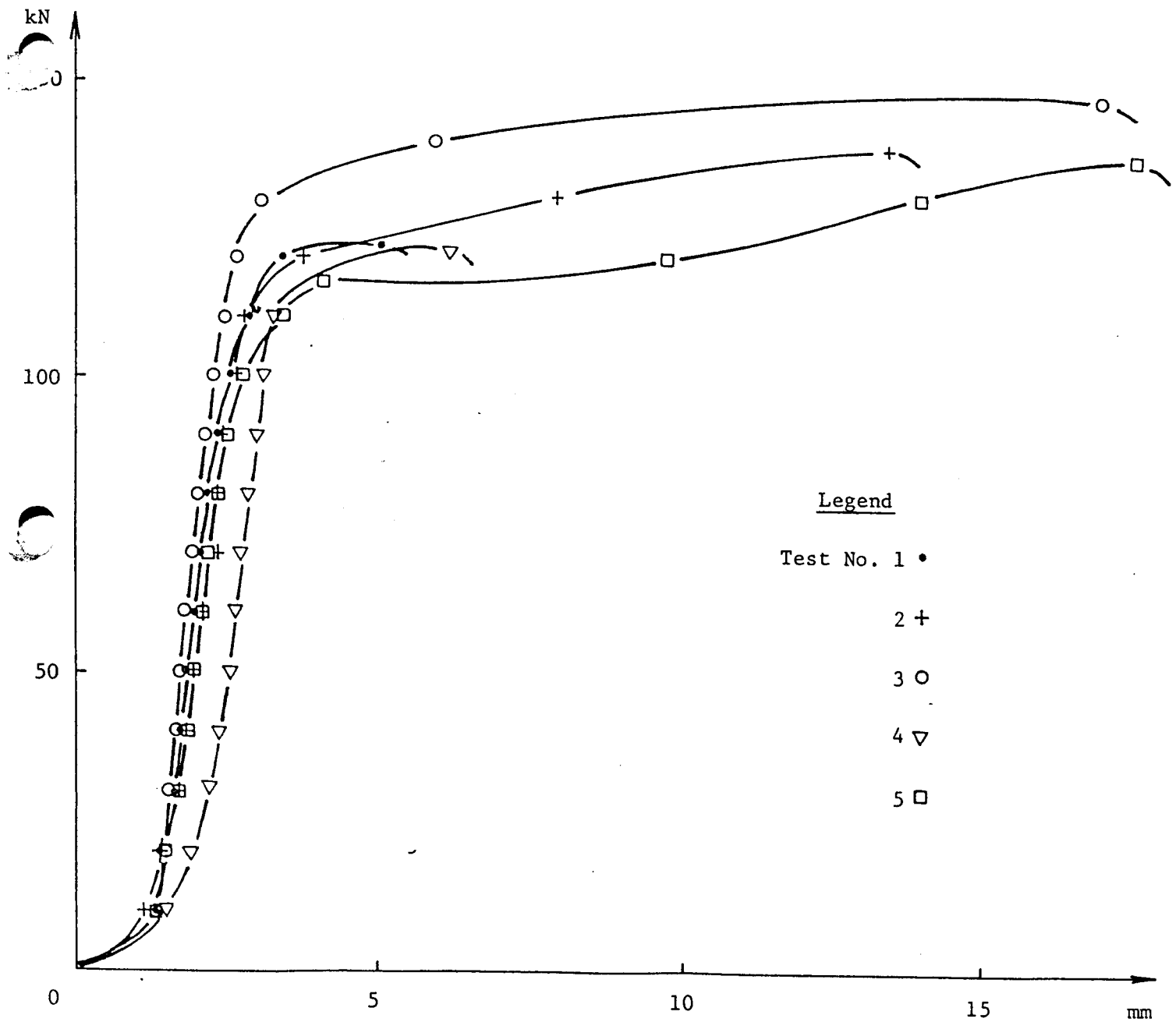
Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y16 x 160



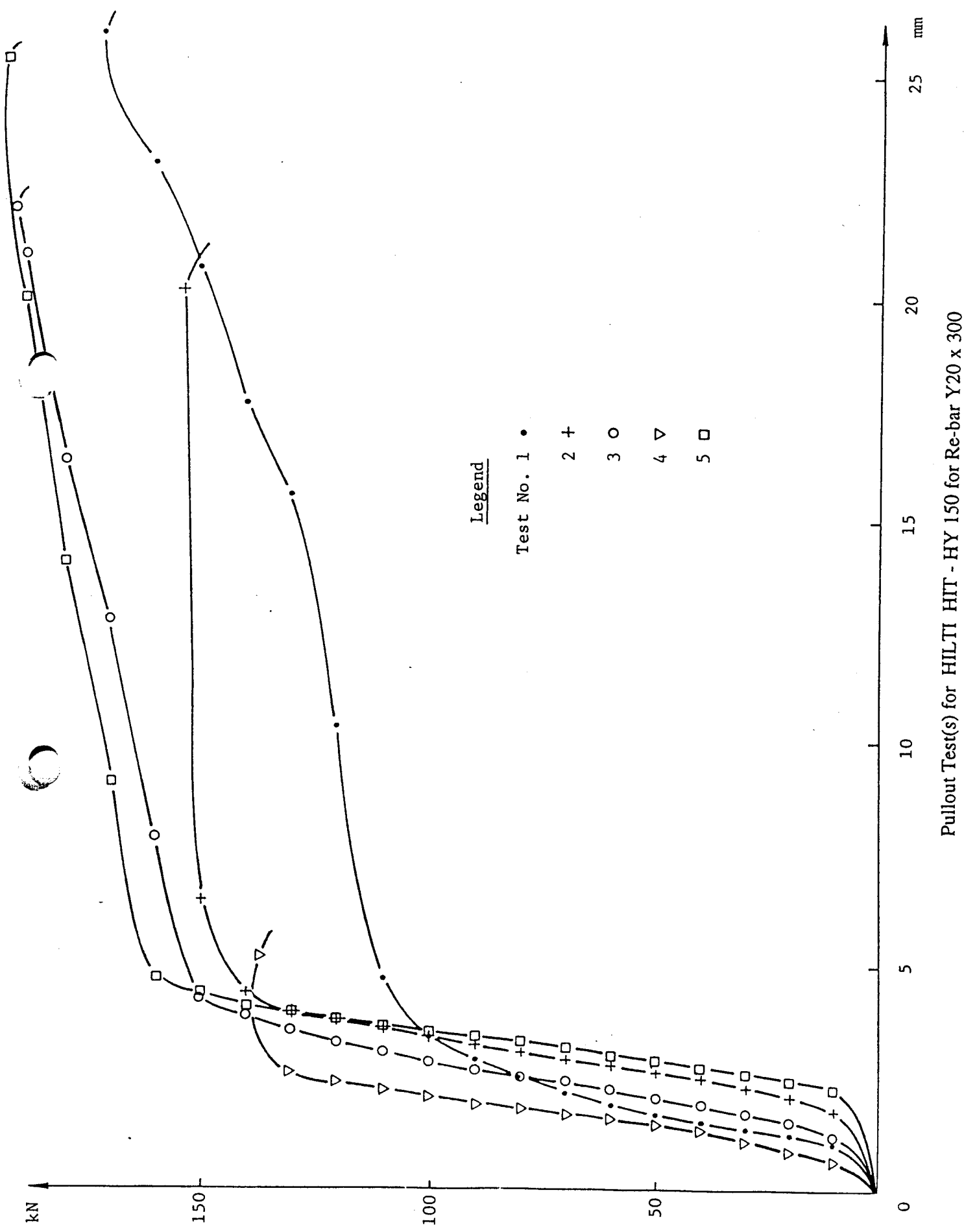
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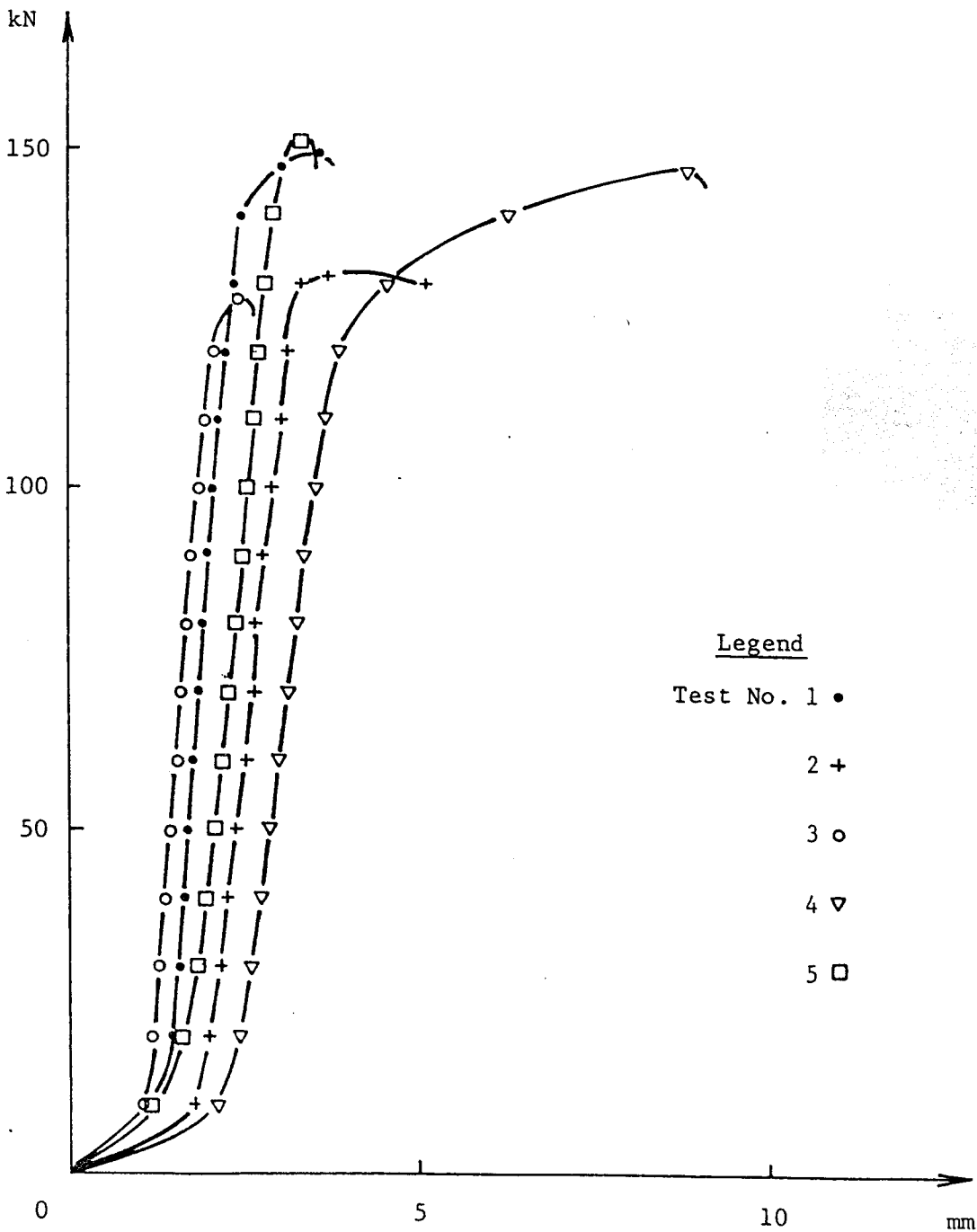
- Test No. 1 •
- 2 +
- 3 ○
- 4 ▽
- 5 □

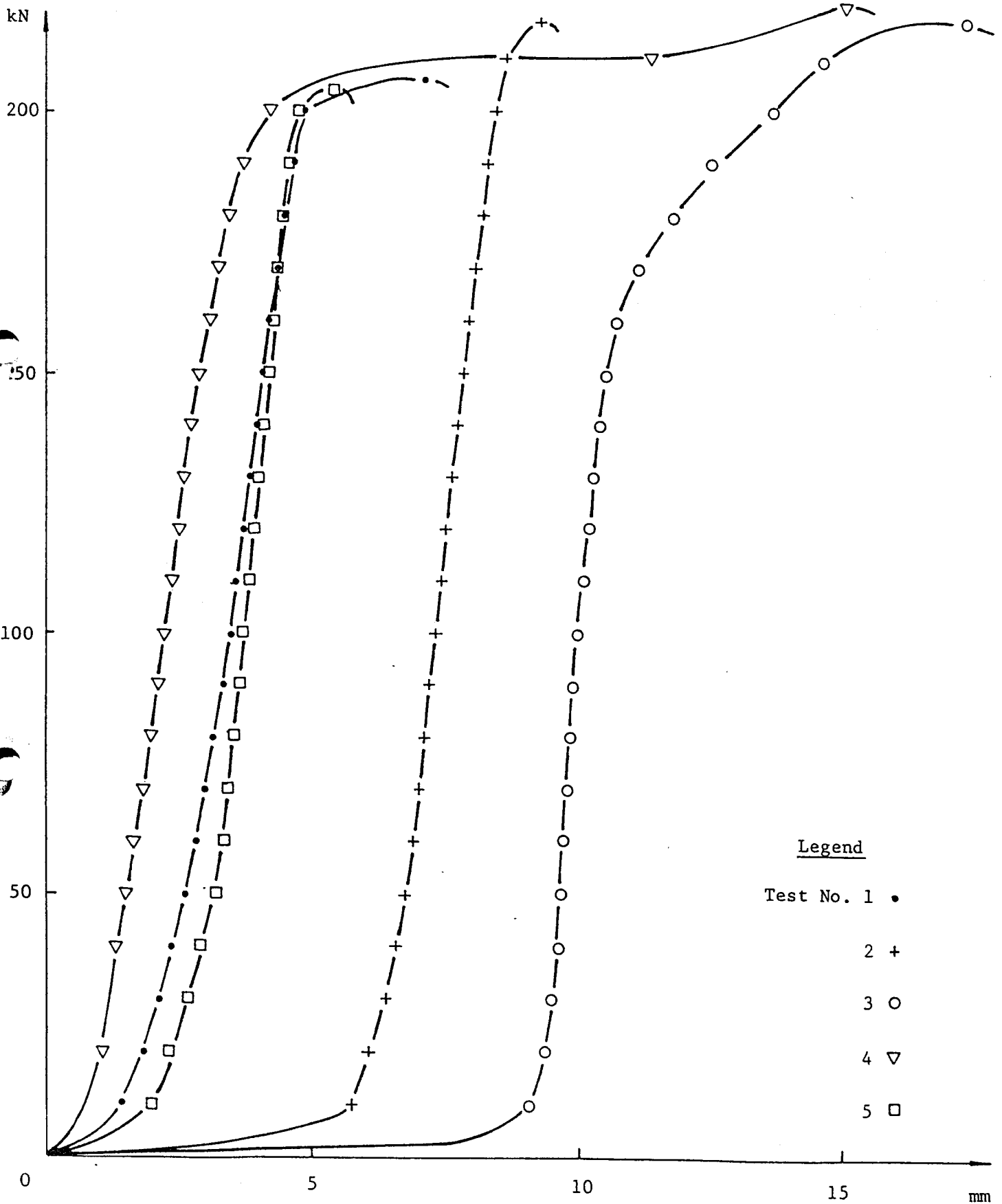
Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y16 x 240



Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y20 x 200







Legend

Test No. 1 •

2 +

3 ○

4 ▽

5 □

Pullout Test(s) for HILTI HIT - HY 150 for Re-bar Y25 x 375

ORIGINAL



香港試驗有限公司

HONG KONG TESTING CO., LTD.

LABORATORY TEST REPORT

Report Serial No. : H06099M1487

Customer : HILTI (HONG KONG) LTD.
17/F., Tower 6,
China Hong Kong City,
33 Canton Road,
T.S.T., Hong Kong

Project/Source : -

Sample : Proof Load Test on Grouted Dowel Bar

Date Received : 22 September 1999
Date Test Started : 22 September 1999
Date Test Completed : 4 November 1999

Date of Issue : 17 November 1999

11th Floor, Flat C/D On Shing Industrial Building,
2-16 Wo Liu Hang Rd., Fo Tan, Sha Tin, N.T., Hong Kong.
沙田火炭禾寮坑道2-16號安盛工業大廈十二樓C及D座

Tel: 2692 2171 (6 Lines)
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香港試驗有限公司
HONG KONG TESTING CO., LTD.

11th Floor, Flat C & D On Shing Industrial Bldg., 2-16 Wo Liu Hang Rd., Fo Tan, Sha Tin, N.T., Hong Kong. Tel: 2692 2171
沙田火炭禾輦坑道二至十六號安盛工業大廈十二樓C及D座 電話：二六九二 二一七一 Fax: (852) 2691 4874

REPORT ON INSITU PROOF LOAD TEST

Report Serial No. : H06099M1487
Client : HILTI (HONG KONG) LTD.
Site Location : KLN BAY
Test Description : Proof-Load Test on Grouted Dowel Bars
Sample Type : Y 32
Date Casted : 3 November 1999
Date Tested : 4 November 1999

Equipment Used : Pressure Gauge -Equ I.D. No. : ENG-PG-1
: Hydraulic Cylinder -Equ I.D. No. : ENG-HJ-5
: Hydraulic Hand Pump -Equ I.D. No. : ENG-HP-1

Testing Standard : In-house method based on BS 5080 : Part 1

*Grout Used : HILTI - HIT - HY150 Injection System

Concrete Size : 2200 X 2210 X 1200 mm

Concrete Grade : 30/20

*Predrilled Hole Diameter : 40 mm

*Embedded Length : 480 mm

*Grouted Dowel Bar Diameter : Y 32 mm

Test Result

Sample I.D.	Test Location	HKT Sample No.	*Date Cast	*Max.Applied Load (kN)	Gauge Pressure (Psi)	Observation ^{**} (1/2/3)
Location 1	KLN BAY	P99M21051	3/11/1999	373.6	3900	1
Location 2	KLN BAY	P99M21052	3/11/1999	449.7	4700	1
Location 3	KLN BAY	P99M21053	3/11/1999	468.8	4900	1
Location 4	KLN BAY	P99M21054	3/11/1999	421.2	4400	1
Location 5	KLN BAY	P99M21055	3/11/1999	459.3	4800	1
				Mean Value	434.5	

**Test Results : 1-Observation Dowel Bars deformed
: 2-Observation Debonding at the concrete / grout interface.
: 3-Observation Debonding at the grout / steel.

Remarks : *Information provided by client.

Tested by : K.K.Cheung/K.M.Shek/K.L.Kong

Signed : For and on behalf of
HONG KONG TESTING COMPANY LIMITED

Checked by :

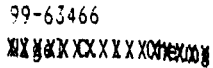
Dennis S.Y. Yeung
Deputy Lab Manager

150 mm CONCRETE CUBE

Form Ref: CON-PHY-0101,0201,REP
Revision: 97/01

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HOKLAS

REGISTRATION NO. 12
REPORT SERIAL NO. 99-63466
APPROVED SIGNATORY: 
Dennis S.V. Yeung

DD/MM/YR

SR: HILTI (H.K.) LTD.
17/F., TOWER 6, CHINA HONG KONG CITY,
33 CANTON ROAD, TSIMSHATSUI, KOWLOON

DATE OF ISSUE : 22/10/99
HKT JOB REFERENCE : H60/01/230999/02
NO. OF SPECIMEN : 2
DATE RECEIVED : 23/09/99
DATE TESTED : 20/10/99
MACHINE REFERENCE : 6
OPERATOR : MMC

JECT: CHIU HING KOWLOON BAY


Information provided by customer

Weight (kg)	Max Load (kN)	Density (kg/m ³)	Compressive Strength (N/mm ²)	Age (days)	Date Cast	Mix	Location	Remarks (see code)
7.805	865	2330	38.5	28	22/09/99	30D/20	PRECAST CONCRETE BLOCK FOR	WRLSdTwSIND
7.845	853	2360	38.5	28	22/09/99	30D/20	TESTING OF GROUTING MATERIAL	WRLSdTwSIND

Remark : Dimensions (a1 x b1 x c1) of Cube :
Cube mark HILTI-3 : 150x149x150mm
Cube mark HILTI-4 : 150x148x150mm

<p>Condition as received /et Money Combing oversize undersize edge damaged corner damaged void ry</p> <p>ness 90:Section 12) (AMD. 1201) egular regular</p> <p>were carried out th : 1970 5MN/m² min <input type="checkbox"/> 16: 1983 35N/mm² .s <input type="checkbox"/> n 12 (AMD. 1201) <input checked="" type="checkbox"/></p>	<p>Density Sd-Saturated R-As received (Determined in accordance with BS 1881: Part 114: 1983 <input type="checkbox"/> Section 6) (AMD. 6098) or (CS1: 1990: Section 16) (AMD. 1201) <input type="checkbox"/> or (CS1: 1990: Section 16) (AMD. 1201 & 1203) <input checked="" type="checkbox"/></p>	<p>Moisture Condition at testing Tw - Wet Surface Td - Dry Surface</p>	<p>Fracture Type S- Satisfactory A(1)- Unsatisfactory (Number in bracket means type of unsatisfactory failure. Fig.2 of BS1881: Part 116: 1983 or Fig.6 of CS1: 1990: Section 12) (AMD. 1201)</p>	<p>Curing in Laboratory I - Immersed in water at temp. 27±2° C (BS1881: Part 111: 1983) or 27±3° C (CS1: 1990: Section 10) (AMD. 1101) Nominal dimensions Nd-150mm±1.5mm BS1881: Part 116:1983 Nd-a1, c1: 150±1mm b1: 150±2mm CS1: 1990: Section 12 (AMD. 1201) <input checked="" type="checkbox"/></p>	<p>Treatment to remove fins Y- Yes</p> <p>Time for cures made specified: by client <input type="checkbox"/> by staff <input type="checkbox"/></p> <p>Time for water added specified: by client <input type="checkbox"/> by staff <input type="checkbox"/></p>
---	--	--	---	---	---

Information under Clause 8.2 of BS1881: Part 116: 1983 refer to attached report serial no
Information under CS1: 1990: Section 1,2,7,10 (AMD. 1101) are provided by customer: YES NO
refer to attached report(s) Serial No.:

Certified by: 

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香港試驗有限公司

HONG KONG TESTING CO., LTD.

LABORATORY TEST REPORT

Report Serial No. : H06098M0425

Customer : HILTI (HK) LTD.
Unit 3, 5/F.,
Harbour Centre, Tower 2,
8 Hok Chung St.,
Hung Hom, Kln.

Project/Source : -

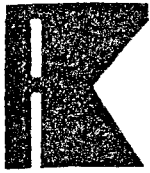
Sample : Bond Strength of Grouted Dowel Bar

Date Received : 18 July 1998
Date Test Started : 18 July 1998
Date Test Completed : 23 September 1998

Date of Issue : 8 October 1998

11th Floor, Flat C/D On Shing Industrial Building,
2-16 Wo Liu Hang Rd., Fo Tan, Sha Tin, N.T., Hong Kong.
沙田火炭禾寮坑道2-16號安盛工業大廈十二樓C及D座

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香港試驗有限公司
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Fax: (852) 2691 4874

REPORT ON INSITU PROOF LOAD TEST

Report Serial No. : H06098M0425
Client : HILTI (HONG KONG) LTD.
Site Location : KLN BAY
Test Description : Proof-Load Test on Grouted Dowel Bars
Sample Type : Y40
Date Casted : 17 September 1998
Date tested : 23 September 1998

Equipment Used : Pressure Gauge - Equ. I.D. No.: ENG-PG-1
Hydraulic Cylinder - Equ. I.D. No.: ENG-HJ-5
Hydraulic Hand Pump - Equ. I.D. No.: ENG-HP-1

Testing Standard : In-House method based on BS 5080 part 1

* Grout Used : HILTI - HIT HY150 Injection System

Concrete size : 2200 X 2210 X 1200 mm

Concrete grade : 30/20

* Predrilled Hole Diameter : 48 mm

* Embedded Length : 600 mm

* Grouted dowel bar Diameter : 40 mm

Test Result

Sample I. D.	Test Location	HKT Sample No.	* Date Cast	*Max.Applied Load (kN)	Gauge Pressure (Psi)	Observatio **(1/2/3)	Remarks
Location 1	KLN BAY	P98M2185	23/9/1998	555.8	5800	1	-
Location 2	KLN BAY	P98M2186	23/9/1998	461.5	4800	2	-
Location 3	KLN BAY	P98M2187	23/9/1998	565.2	5900	1	-
Location 4	KLN BAY	P98M2188	23/9/1998	521.5	5500	1	-
Location 5	KLN BAY	P98M2189	23/9/1998	555.8	5800	2	-
				Mean Value	531.96		

**Test Results : 1 - Observation Dowel Bars deformed
2 - Observation Debonding at the concrete / grout interface.
3 - Observation Debonding at the grout / steel.

Remarks : *information provided by client.

Tested by : K.L.NG/K.M.SHECK/K.K.CHEUNG

Signed :

For and on behalf of
HONG KONG TESTING COMPANY LIMITED

Checked by : [Signature]

[Signature]
NOEL C.L. CHEUNG
Laboratory Manager

COMPRESSION TEST CERTIFICATE

150 mm CONCRETE CUBE

Form Ref: CON-PHY-0101.0201/REP
Revision: 97/01



香港試驗有限公司
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HOKLAS

REGISTRATION NO. 12
REPORT SERIAL NO. 98-28107
APPROVED SIGNATORY: ~~W. Choi~~
T.W. Choi

DD/MM/YR

CUSTOMER: HILTI (H.K.) LTD.
17/F., TOWER 6, CHINA HONG KONG CITY,
33 CANTON ROAD, TSIMSHATSUI, KOWLOON

DATE OF ISSUE : 24/08/98
HKT JOB REFERENCE : H60/01/180798/01
NO. OF SPECIMEN : 2
DATE RECEIVED : 18/07/98
DATE TESTED : 14/08/98
MACHINE REFERENCE : 6
OPERATOR : YML

SITE/PROJECT: CHIU HING KOWLOON BAY

Cube Mark	Weight (kg)	Max Load (kN)	Density (kg/m ³)	Information provided by customer					Remarks (see code)
				Compressive Strength (N/mm ²)	Age (days)	Date Cast	Mix	Location	
HILTI-1	8.145	935	2300	41.5	28	17/07/98	30D/20	PRECAST CONCRETE BLK. FOR TESTING OF GROUTING MATERIAL	WRLSDTWSIND
HILTI-2	8.165	904	2400	40.0	28	17/07/98	30D/20		WRLSDTWSIND

Remark : Dimensions (a1 x b1 x c1) of Cube :
Cube mark HILTI-1 : 151x150x151mm
Cube mark HILTI-2 : 150x151x150mm

CODE: Condition of Cube as received
W - Wet
H - Honey Combing
O - Oversize
U - Undersize
E - Edge damaged
C - Corner damaged
V - Void
D - Dry

Squareness (CS1:1990:Section 12) (AMD. 1201)
RL - Regular
IL - Irregular

Density
Sd - Saturated
R-As received
(Determined in accordance with BS 1881: Part 114: 1983 or (CS1: 1990: Section 6) (AMD. 6098) or (CS1: 1990: Section 16) (AMD. 1201) or (CS1: 1990: Section 16) (AMD. 1201 & 1203)

Moisture Condition at testing
Tw - Wet Surface
Td - Dry Surface

Fracture Type
S - Satisfactory
A(1) - Unsatisfactory (Number in bracket means type of unsatisfactory failure. Fig.2 of BS1881: Part 116: 1983 or Fig.6 of CS1: 1990: Section 12) (AMD. 1201)

Curing in Laboratory
I - Immersed in water at temp. 27±2°C (BS1881: Part 111: 1983) or 27±3°C (CS1: 1990: Section 10) (AMD. 1101)
Nominal dimensions
Nd-150mm±1.5mm
BS1881: Part 116:1983
Nd-a1, c1: 150±1mm
b1: 150±2mm
CS1: 1990: Section 12 (AMD. 1201)

Treatment to remove fins
Y - Yes
Time for cubes made specified: by client by staff
Time for water added specified: by client by staff

The above tests were carried out in accordance with
B.S. 1881: Part 4: 1970 Loading rate at 15MN/m² min
B.S. 1881: Part 116: 1983 Loading rate at 0.35N/mm² s
CS1: 1990: Section 12 (AMD. 1201)

Information under Clause 8.2 of BS1881: Part 116: 1983 refer to attached report serial no
Information under CS1: 1990: Section 1.2.7.10 (AMD. 1101) are provided by customer: YES NO
refer to attached report(s) Serial No.:

Certified by: T.W. Choi

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**The Fire Performance of Various Types of
Anchor Fixing Systems for Use in Concrete
Structures: Hilti HIT-HY 150 and HIT-RE 500
Injection Systems for Rebar Connection**

Report for

Hilti Entwicklung Befestigungstechnik GmbH
Hiltistrasse 22
86916 Kaufering
Germany

Warrington
FIRE
research
CONSULTANCY • TESTING

The Professionals in Fire Safety

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1 Introduction

This report provides a considered opinion regarding the fire performance of various types of anchor fixing systems for use in concrete structures when subjected to tests utilising the general principles of BS 476: Part 20: 1987.

The report considers the test procedures and subsequent data obtained from tests conducted at the Institut Für Baustoffe Massivbau und Brandschutz, Technische Universität Braunschweig (IBMB), Germany, and the general principles of BS 476: Part 20: 1987.

This report refers to test data from IBMB carried out on Hilti HIT-HY150 and HIT-RE 500 injection adhesive used to make connections in concrete floor structures via reinforcing bars (referred to as rebar).

The data referred to in Sections 7 and 8 of this report has been considered for the purpose of this appraisal which has been prepared in accordance with the general principles of the Fire Test Study Group Resolution No. 82: 2001.

2 Assumptions

It is assumed that the concrete elements into which the various types of rebar are installed will be constructed in accordance with BS 8110: Part 2: 1985 and have a minimum compressive strength of 25 N/mm².

The fire performance rating of the injection systems is assumed to apply to reinforced concrete elements which have been designed to give at least the same period of fire resistance as that for the injection system.

The injection systems are assumed to be installed correctly and in accordance with Hilti Entwicklung Befestigungstechnik GmbH installation instructions.

It is assumed that the steel for the reinforcing bar is at least equal in strength to that used for the tested arrangements or as otherwise indicated in this report.

In addition, it is assumed that the application of the injection adhesive is identical to that adopted for the tested arrangements and that the fire test exposure is in one direction only.

3 Hilti Systems

3.1 Hilti HIT-HY 150 Injection System

The Hilti HIT-HY 150 injection system is an adhesive mortar which is used for making rebar connections in steel reinforced concrete structure. The adhesive system is based on a modified epoxy acrylate resin and on the hydraulic cement reaction.

The appropriate steel rebar diameter ranges from 8mm to 25mm and the insertion depth (anchorage) is calculated on the basis of the rebar diameter multiplied by 10.

The Hilti system may be installed in two arrangements, an overlapping method whereby the connecting rebar is inserted within a prepared hole such that it overlaps existing rebar and an anchoring arrangement.

A full description is given in the appropriate test report referred to in Section 7.

3.2 Hilti HIT-RE 500 Injection System

The Hilti HIT-RE 500 injection system is a two component adhesive mortar which is used for making rebar connections in steel reinforced concrete structure. The adhesive system is based on an epoxy resin and an amine based hardener.

The appropriate steel rebar diameter ranges from 8mm to 40mm and the Insertion depth is calculated on the basis of the rebar diameter multiplied by 10 (The tests included a reduced insertion depth to ensure ultimate performance of the system could be assessed).

The Hilti system may be installed in two arrangements, an overlapping method whereby the connecting rebar is inserted within a prepared hole such that it overlaps existing rebar and an anchoring arrangement.

A full description is given in the appropriate test report referred to in Section 7.

4 Test Data/Analysis Procedure

The test data which provides evidence in support of this assessment is given in test reports Nr. 3162/6989 and Nr 3357/0550-5 prepared by IBMB.

There are at present no published British Standards applicable to the testing and determination of the performance of rebar connection systems for use in structural grade concrete which may be subjected to fire.

The test evidence referred to in this report has been provided from an extensive testing programme carried out in accordance with DIN 4102: Part 2: 1977 at the Institut Für Baustoffe, Technische Universität Braunschweig. The heating conditions of DIN 4102: Part 2: 1977 are largely based upon those referred to in ISO 834, upon which the heating and test procedures given in BS 476: Part 20: 1987 are also based.

Therefore, the heating conditions of the two testing procedures are sufficiently similar to allow for correlation.

In the absence of a British Standard test method to determine the performance of fixings under fire it would seem appropriate to subject the injection systems to standardised heating conditions while carrying either some or all of their designated load and derive a performance ratings for the systems.

The testing referred to in Nr 3162/6989 and Nr 3357/0550-5 was conducted on both 'overlap' and 'anchoring' arrangements with various diameter steel rebars.

Briefly, the rebars were installed in small concrete cylinders using the referenced Hilti injection systems applied in accordance with the manufacturer's instructions. The rebars were loaded by hydraulic means to induce tensile stress in the rebar and the connection system. The cylinders were exposed to the heating conditions of DIN 4102: Part 2: 1977 (similar to BS 476: Part 20: 1987).

Thermocouples were used to measure the temperature profile of the bonding material (generally at the top and bottom of the hole) and the displacement of the rebar was also measured. A full description of the test procedure is given in the test reports.

The performance of the system was defined in relation to the failure temperature of the adhesive system under load (termed the bond stress).

The test data, the method of analysis and the results of the analysis are fully presented in reports Nr 3162/6989 (including supplementary letter 120/2) and Nr 3357/0550-5.

The test reports provided graphs showing plots of failure temperature against the critical temperature dependent bond stress. The resulting curve was drawn such that it was below the test values and therefore represented a conservative approach. This conservative curve was adopted in the analysis for each injection system.

The curve was used to develop specifications of limiting bond stress against concrete cover for various fire resistance periods using an established temperature/concrete depth relationship.

The limiting stress was recalculated to give a limiting load appropriate to the rebar diameter for various fire resistance periods and anchorage length.

Tables 1 to 2 show the limiting load in relation to rebar diameter, anchorage length for various fire resistance periods for each of the injection systems.

The tables relate to a minimum yield strength of rebar of 460N/mm² and partial safety factors equal to at least those specified in BS 8110: Part 1: 1987.

5 Conclusion

There is not at present a British Standard test method for determining the ability of fixing systems to support their recommended service loads under fire resistance test conditions.

In the absence of a recognised test procedure a series of tests utilising heating conditions comparable with those of BS 476: Part 20: 1987 has been performed on the Hilti HIT-HY 150 and Hilti HIT-RE 500 injection systems to determine their ability to make connections via reinforcing bars in concrete structures required to provide fire resistance.

The data provided by the test series has been analysed with respect to details as given in this supplement and performance ratings for the connection system relating to 30 minutes to 240 minutes fire test exposure have been derived.

The results of the analysis appropriate to rebars of 8mm to 25mm diameters in the case of HIT-HY 150 and 8mm to 40mm in the case of HIT-RE 500 are summarised in Tables 1 and 2.

6 Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to WFRC the assessment will be unconditionally withdrawn and Hilti Entwicklung Befestigungstechnik GmbH will be notified in writing.

Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years, i.e. until 1st October 2007 at which time it is recommended that it be returned for re-appraisal.

This appraisal is only valid provided that no other modifications are made to the construction other than those described in this report.

7 Summary of Primary Supporting Data

***Institut Für Baustoffe, Massivbau und Brandschutz (Germany)
Report Reference Nr. 3162/6989***

Latest report on a number of fire tests, in accordance with DIN 4102: Part 2: 1977, to determine the performance of the Hilti HIT-HY 150 rebar connection system.

Test dates : Between 1994 and 1999.

***Institut Für Baustoffe, Massivbau und Brandschutz (Germany)
Supplementary Letter 120/2 to Report Reference Nr. 3162/6989***

The performance of the Hilti HIT-HY 150 rebar connection system in relation to BS 8110: Part 1: 1997.

***Institut Für Baustoffe, Massivbau und Brandschutz (Germany)
Report Reference Nr. 3357/1550-5***

Latest report on a number of fire tests, in accordance with DIN 4102: Part 2: 1977, to determine the performance of the Hilti HIT-RE 500 rebar connection system.

Test dates : Between 2000 and 2001.

8 Summary of Secondary Supporting Data

BS 476: Part 20: 1987

Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles).

BS 8110: Part 1: 1997

Structural use of concrete Part 1. Code of practice for design and construction.

DIN 4102-, 1977-09

Fire behaviour of building materials and building components: definitions, requirements and tests on building components.

9 Declaration by Hilti Entwicklung Befestigungstechnik GmbH

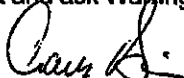
We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this supplement from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.


We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the supplement and ask Warrington Fire Research Centre to withdraw the assessment.

Signed:  **Dr. Franz Böhm**
Head of Hilti Development Fastening Systems

For and on behalf of: Hilti Entwicklung Befestigungstechnik GmbH.

10 Signatories

Prepared by:  * P W Crewe

Reviewed by:  *C W Miles

This report is not valid unless it incorporates the declaration duly signed by the applicant. This is included in Section 9 of this report
*For and on behalf of Warrington Fire Research Centre.

Report Issued: 25th September 2002

Issue 2 : Typing error on Table 1, Page 8

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Table 1 Maximum Rebar Force for HIT-HY 150 Injection System

Nominal rebar dia Mm	Drill hole dia mm	Max force of rebar kN	Anchorage depth of rebar mm	Maximum force of rebar in conjunction with injection system for fire resistance period kN					
				30 mins	60 mins	90 mins	120 mins	180 mins	240 mins
8	10	15.73	65	1.96	0.74	0.19	0.04	-	-
			80	3.54	1.51	0.58	0.25	-	-
			95	6.18	2.49	1.26	0.69	0.11	-
			115	9.70	4.41	2.43	1.65	0.50	0.15
			150	15.73	10.13	6.13	4.05	2.09	1.06
			185		15.73	12.29	9.45	4.29	2.84
			205			15.73	12.97	5.69	4.15
			225				15.73	7.38	5.81
			275					15.73	14.02
			285						15.73
10	12	24.58	80	4.43	1.88	0.72	0.31	-	-
			100	8.83	3.55	1.88	1.10	0.22	-
			120	13.23	6.22	3.46	2.42	0.82	0.28
			140	17.62	10.46	5.62	4.12	1.92	0.88
			175	24.58	18.16	13.16	9.61	4.52	2.83
			205		24.58	19.76	16.21	7.12	5.18
			230			24.58	21.71	9.93	7.95
			245				24.58	13.07	10.93
			300					24.58	23.03
			310						24.58
12	16	35.39	95	9.27	3.73	1.88	1.04	0.17	-
			120	15.87	7.46	4.15	2.90	0.98	0.34
			145	22.47	13.87	7.97	5.50	2.71	1.32
			195	35.39	27.07	21.07	16.81	7.46	5.20
			230		35.39	30.31	26.05	11.91	9.54
			250			35.39	31.33	17.00	14.44
			270				35.39	22.28	19.72
			320					35.39	32.91
330						35.39			
14	18	48.17	110	15.44	6.73	3.65	2.38	0.62	0.13
			140	24.67	14.65	7.87	5.76	2.68	1.23
			170	33.91	23.88	16.89	11.92	5.76	3.47
			220	48.17	39.28	32.28	27.31	11.92	9.19
			250		48.17	41.52	36.55	19.84	16.85
			275			48.17	44.25	27.53	24.54
			290				48.17	32.15	29.16
			345					48.17	46.09
355						48.17			
16	20	62.92	130	24.68	13.22	6.99	5.18	2.11	0.85
			160	35.24	23.78	15.78	10.35	5.33	2.97
			190	45.79	34.33	26.34	20.66	9.25	6.28
			240	62.92	51.92	43.93	38.25	19.15	15.73
			275		62.92	56.25	50.57	31.47	28.05
			295			62.92	54.60	38.50	35.09
			315				62.92	45.54	42.12
			365					62.69	59.72
375						62.92			

Minimum yield strength of rebar 460 N/mm².

Intermediate values may be obtained by linear interpolation. No extrapolation allowed

Table 1 Continued Maximum Rebar Force for HIT-HY 150 Injection System

Nominal rebar dia mm	Drill hole dia mm	Max force of rebar kN	Anchor age depth of rebar mm	Maximum force of rebar in conjunction with injection system for fire resistance period kN						
				30 mins	60 mins	90 mins	120 mins	180 mins	240 mins	
20	25	98.31	160	44.05	29.72	19.73	12.94	6.66	3.71	
			200	61.64	47.31	37.32	30.22	13.32	9.49	
			285	98.31	84.70	74.71	67.61	43.73	39.46	
			320		98.31	90.10	83.00	59.13	54.85	
			340			98.31	91.80	83.00	67.92	63.65
			355				98.31	91.80	74.52	70.25
			410					98.31	98.31	94.44
			420					98.31		
25	30	153.61	200	77.05	59.14	46.65	37.78	16.65	11.86	
			250	104.54	86.63	74.14	65.27	35.42	30.08	
			340	153.61	136.11	123.62	114.75	84.90	79.58	
			375		153.61	142.86	133.99	104.14	98.80	
			395			153.61	144.98	115.14	109.80	
			415				153.61	126.14	120.79	
			465					153.61	148.28	
			475						153.61	

Minimum yield strength of rebar 460 N/mm².

Intermediate values may be obtained by linear interpolation. No extrapolation allowed

Table 2 Maximum Rebar Force for HIT-RE 500 Injection System

Nominal rebar dia mm	Drill hole dia mm	Max force of rebar kN	Anchorage depth of rebar mm	Maximum force of rebar in conjunction with injection system for fire resistance period kN					
				30 mins	60 mins	90 mins	120 mins	180 mins	240 mins
8	10	15.73	65	1.38	0.57	0.19	0.05	-	-
			80	2.35	1.02	0.47	0.26	-	-
			95	3.87	1.68	0.88	0.55	0.12	-
			115	7.30	3.07	1.71	1.14	0.44	0.18
			150	15.73	8.15	4.59	3.14	1.41	0.80
			180		15.73	9.99	6.75	2.94	1.70
			205			15.73	12.38	5.08	2.86
			220				15.73	6.95	3.82
			265					15.73	8.57
			305						15.73
10	12	24.58	80	2.94	1.27	0.59	0.33	-	-
			100	5.68	2.45	1.31	0.85	0.24	-
			120	10.66	4.44	2.48	1.68	0.68	0.31
			140	17.57	7.76	4.38	2.99	1.33	0.73
			165	24.58	15.06	8.50	5.79	2.58	1.50
			195		24.58	17.63	12.18	5.12	2.93
			220			24.58	20.66	8.69	4.78
			235				24.58	11.80	6.30
			280					24.58	13.86
			320						24.58
12	16	35.39	95	5.80	2.52	1.32	0.83	0.18	-
			120	12.79	5.33	2.97	2.01	0.82	0.37
			145	23.16	10.68	6.02	4.12	1.84	1.03
			175	35.39	22.22	13.20	8.94	3.93	2.26
			210		35.39	27.38	20.65	8.47	4.74
			230			35.39	28.94	12.80	6.90
			250				35.39	19.13	9.89
			290					35.39	19.70
			330						35.39
14	18	48.17	110	10.92	4.65	2.55	1.70	0.61	0.20
			140	24.60	10.87	6.13	4.19	1.86	1.03
			170	39.12	23.50	13.55	9.20	4.07	2.37
			190	48.17	33.18	22.27	15.10	6.43	3.69
			225		48.17	39.20	31.34	13.48	7.34
			245			48.17	41.02	20.20	10.56
			260				48.17	27.07	13.75
			305					48.17	29.66
345						48.17			
16	20	62.92	130	22.59	9.42	5.30	3.61	1.56	0.80
			160	39.17	21.33	11.95	8.15	3.65	2.11
			190	55.76	37.92	25.45	17.25	7.35	4.22
			205	62.92	46.21	33.74	24.76	10.16	5.73
			240		62.92	53.10	44.12	20.88	11.04
			260			62.92	55.17	30.94	15.72
			275				62.92	39.23	20.36
			320					62.92	42.08
360						62.92			

Minimum yield strength of rebar 460 N/mm².

Intermediate values may be obtained by linear interpolation. No extrapolation allowed

Table 2 Continued Maximum Rebar Force for HIT-RE 500 Injection System

			Anchorage depth of rebar	Maximum force of rebar in conjunction with injection system for fire resistance period kN					
			mm	30 mins	60 mins	90 mins	120 mins	180 mins	240 mins
20	25	98.31	160	48.97	26.67	14.93	10.18	4.56	2.64
			200	76.61	54.31	38.73	24.50	11.42	6.48
			235	98.31	78.50	62.92	51.69	23.60	12.60
			265		98.31	83.65	72.42	42.13	21.43
			290			98.31	89.70	59.41	32.83
			305				98.31	69.77	42.23
			350					98.31	73.33
			390					98.31	
25	30	153.61	200	95.77	67.89	48.41	31.37	14.27	8.10
			250	138.95	111.09	91.60	77.57	39.86	20.61
			270	153.61	128.37	108.88	94.85	56.98	29.19
			300		153.61	134.80	120.77	82.90	48.55
			325			153.61	142.37	104.50	70.07
			340				153.61	117.45	83.02
			385					153.61	121.90
			425					153.61	
28	35	192.68	225	131.45	100.23	78.41	62.69	26.95	14.69
			250	155.64	124.42	102.60	86.88	44.64	23.08
			290	192.68	163.12	141.30	125.58	83.17	45.95
			325		192.68	175.17	159.45	117.04	78.47
			345			192.68	178.80	138.39	97.83
			360				192.68	150.90	112.34
			405					192.68	155.88
			445					192.68	
32	40	251.67	255	183.40	147.72	122.78	104.82	56.35	28.80
			280	211.05	175.37	150.43	132.47	83.99	44.34
			320	251.67	219.60	194.66	176.70	128.23	84.15
			350		251.67	227.84	209.87	161.40	117.33
			375			251.67	237.52	189.05	144.98
			390				251.67	205.63	161.56
			435					251.67	211.33
			475					251.67	
36	44	318.52	290	248.97	209.73	181.67	161.46	106.93	59.10
			320	287.19	247.05	218.99	198.79	144.25	94.67
			350	318.52	284.37	256.32	236.11	181.58	132.00
			380		318.52	293.64	273.43	218.90	169.32
			400			318.52	298.31	243.78	194.20
			420				318.52	268.66	219.08
			465					318.52	275.06
			500					318.52	
40	47	393.23	320	319.10	274.50	243.33	220.87	160.28	105.19
			350	360.57	315.97	284.80	262.34	201.75	146.66
			375	393.23	350.53	319.35	296.90	236.31	181.22
			410		393.23	367.73	345.28	284.69	229.60
			430			393.23	372.93	312.33	257.25
			445				393.23	333.07	277.98
			490					393.23	340.18
			530					393.23	

Minimum yield strength of rebar 460 N/mm².

Intermediate values may be obtained by linear interpolation. No extrapolation allowed

Mr Thomas Choy
Hilti (Hong Kong) Limited
17/F I Tower 6
China Hong Kong City 33
Canton Road
Tsim Sha Tsui
Kowloon
Hong Kong

Review of Assessment Referenced WFRC Report No. C121086

1 Introduction

WFRC Report No. C121086 presents a considered opinion regarding the expected fire performance of various types of anchor fixing systems for use in concrete structures when subjected to tests utilising the general principles of BS 476: Part 20: 1987.

The report concluded that there was not a British Standard test method for determining the ability of fixing systems to support their recommended service loads under fire resistance test conditions.

In the absence of a recognised test procedure a series of tests utilising heating conditions comparable with those of BS 476: Part 20: 1987 was been performed on the Hilti HIT-HY 150 and Hilti HIT-RE 500 injection systems to determine their ability to make connections via reinforcing bars in concrete structures required to provide fire resistance.

The data provided by the test series was analysed with respect to details as given in the supplement and performance ratings for the connection system relating to 30 minutes to 240 minutes fire test exposure were derived.

The results of the analysis appropriate to rebars of 8mm to 25mm diameters in the case of HIT-HY 150 and 8mm to 40mm in the case of HIT-RE 500 were summarised in Tables 1 and 2.

2 Confirmation of Specification

It has been confirmed by Hilti Entwicklungsgesellschaft mbH, there have been no changes to the specification appraised in the original report referenced WFRC Report No. C121086.

3 Conclusions

The data used for the original appraisal has been re-examined and found to be satisfactory.

Although there is now also the possibility of European Technical Approval for fixings of the types described in WFRC No. C121086, the procedures adopted for the original assessment have also been re-examined and are similar to those currently in use.

Therefore, with respect to the assessment of performance given in WFRC Report No. C121086, the contents should remain valid until the 1st June 2014.

4 Validity

This review is based on information used to formulate the original test report. No other information or data has been submitted by Hilti Entwicklungsgesellschaft mbH, which could affect this review.

The original appraisal report was performed in accordance with the principles of the UK Fire Test Group Resolution 82: 2001. This review has therefore been conducted using these principles.

Performed by:



C. Johnson
Senior Certification Engineer
Technical Department
Bodycote warringtonfire

Reviewed By:



D. Hankinson
Senior Certification Engineer
Technical Department
Bodycote warringtonfire

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Hilti (Hong Kong) Limited
17/F, Tower 6,
China Hong Kong City,
33 Canton Road,
Tsimshatsui,
Kowloon.

4 June, 1997

Attention: Mr. Denny Wu

Dear Sir,

Procedures for building materials submission

I refer to your letter dated 19 May, 1997 concerning the above.

2. Please be advised that there is no provision under the Buildings Ordinance for the Building Authority to approve any proprietary building products. Under the Buildings Ordinance, authorized persons and/or registered structural engineers are required to supervise building works including the selection and installation of proprietary building products and to certify compliance with the Buildings Ordinance upon completion of works. They are therefore responsible for ensuring the health and structural safety requirements, inter alia, of these building products in the building projects which they have been appointed by the developer to co-ordinate and supervise. It is also their responsibility to ensure these products have been installed in accordance with the manufacturers' specifications and complied with the Buildings Ordinance and Regulations.
3. In establishing the acceptability of the proprietary products in building works, reference may be made to the performance standards laid down in Building (Construction) Regulations 1990 and the current Practice Note for Authorized Persons and Registered Structural Engineers 140 in which performance requirements for compliance are given. Reliance may also be placed on the test/assessment report prepared by a recognized laboratory or an equivalent establishment.
4. Before the proprietary products are installed in a building project, the authorized person and/or registered structural engineer appointed for the project should be approached by the manufacturers or their agents for advice and guidance. **Prior approval/acceptance from the Buildings Department is not required.**
5. Generally, all relevant information supporting the use of the proprietary products in building works under the Buildings Ordinance should be submitted associated with the prescribed plans for approval on project basis.

/ Notwithstanding....

- 2 -

6. Notwithstanding the above, the proprietary building products to which 'No objection' letters have been given are still recognized as accepted constructional materials to be used in building works under the Buildings Ordinance provided that all conditions specified in the letters are satisfied. You are informed that the procedures currently adopted by the Building Authority for processing statutory approval of plans which involve the use of these proprietary building products remain unchanged.

7. It is a fact that the 'No objection' letter giving general acceptance to a proprietary building product is based on the technical information submitted to this Department at the time of its application. Should there be any significant modification to these technical information, the product will certainly be considered as 'new' product. The acceptability of such proprietary product in building works should be evaluated by the authorized person and/or registered structural engineer appointed for the project as mentioned above.

8. Should you have any further queries to the above, please feel free to contact the undersigned or Mr. T.C. Kan of this office at phone no. 2626 1583.

Yours faithfully,



(K.S. Chang)

Technical Secretary/Structural
for Building Authority

tck/



Attn. : To whom it may concern

Date : 27 October 2005

Ref. : LE/024/AC/05

Subject : Hilti HIT HY150 Injection Adhesive

Dear Sirs / Madams,

Enclosed please find the information of Hilti HIT HY150 Injection Adhesive

Brand Name : Hilti
Model Name : Hilti HIT-HY150
Manufacturer : Hilti Corporation
Address of Manufacturer : FL-9494, Principality of Liechtenstein.
Supplier : Hilti (Hong Kong) Ltd
Address of Supplier : 17/F, Tower 6, China Hong Kong City, 33 Canton Road,
Tsim Sha Tsui, Kowloon, Hong Kong.
Country of Origin : Germany
Name of Factory : Hilti GmbH Ind. Ges. F. Befestigungstechnik
Address of Factory : Hiltistrasse 6, D-86916 Kaufering, Germany

Should you have further questions, please do not hesitate to contact our Technical Representatives or Customer Service Hotline at 8228-8118.

Yours sincerely,

Hilti (Hong Kong) Ltd.




Thomas Choy

Marketing Manager

Hilti (Hong Kong) Limited
17/F | Tower 6 | China Hong Kong City
33 Canton Road | Tsim Sha Tsui
Kowloon | Hong Kong
P +852-8228 8118 | F +852-2954 1751
www.hk.hilti.com

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150

Date of revision: July 24, 2000

Replaces edition of: March 02, 1999

1. Chemical product and company identification**Product name:** Hilti HIT-HY150**Manufacturer:** Hilti GmbH Hiltistrasse 6, D-86916 Kaufering**Importer:** Hilti

Phone:

Fax:

Emergency telephone number:

i

2. Composition / Information on ingredients

Adhesive mortar, packaged in a 330-ml two-component foil pack

Adhesive mortar, packaged in an 1100-ml two-component plastic cartridge

Component A: Urethane methacrylate resin with inorganic filler
contains 10-15 % hydroxypropyle methacrylate CAS-No.: 27813-02-1 (Xi: R 36, R43)**Component B:** Dibenzoyl peroxide with inert filler as a paste
contains 5-10% dibenzoyl peroxide CAS-No.: 94-36-0 (O; R7, Xi; R36, R43)**3. Hazard identification****Component A:** Irritating to eyes. Skin contact may cause sensitization.**Component B:** Oxidizing. Skin contact may cause sensitization.**Mixture A + B:** Irritating to eyes. Skin contact may cause sensitization.**4. First - aid measures****Eyes:** Immediately flush with plenty of water for at least 15 minutes. Get medical advice.**Skin:** Remove contaminated clothing. Wash with soap and water.**Inhalation:** Upon breathing in a higher quantity of vapor remove to fresh air. Get medical advice, if necessary.**Ingestion:** Rinse immediately, after that drink plenty of water. Get medical advice.

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150

5. Fire-fighting measures

Extinguishing media:

suitable: carbon dioxide, dry chemical, foam, water spray

not to be used: --

Special fire-fighting procedures:

In case of fire poisonous or irritating gas may be generated. Wear self-contained breathing apparatus and protective clothing.

Medical attention is necessary for symptoms which obviously come from the inhalation of the combustion fumes.

Hazardous combustion products:CO_x, NO_x, water, carbon

6. Accidental release measures

Personal precautions:

Remove ignition sources. Ensure adequate ventilation or self-contained breathing apparatus. Avoid contact with eyes or skin.

Environmental precautions:

Keep away from drains, surface-water, ground-water, and soil.

Cleaning procedures:

Take up by mechanical means. Remove remainder with solvent or liquid-binding material. Disposal according to local regulations.

7. Handling and storage

7.1 Handling:

Avoid contact with skin, eyes and clothing.

Observe expiry date on connection of foilpack or label on cartridge.

7.2 Storage:

Store in original packing in a cool (+5°C to +25°C) and dark place.

Keep away from direct sunlight.

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150

8. Exposure control and personal protection

Respiratory protection: --
Eye protection: safety glasses
Hand protection: chemical resistant gloves,
e.g. nitril-coated cotton gloves
Other: protective work clothing

Industrial hygiene:

Do not breathe vapour. Avoid contact with eyes and skin. Remove soiled or soaked clothing at once. Upon skin contact, clean with a mild cleanser (polyethyleneglycole) then wash with soap and water. Use a handcream.

9. Physical and chemical properties

Form: paste
Colour: grey
Odour: like ester

Changes in condition: component A: polymerisation > 110°C
component B: decomposition
temperature dibenzoyl peroxide
>50°C

Density:
Density [g/cm³] (°C) 1,7 (20)
Bulk density [kg/cm³] not applicable

Vapour pressure [mbar] (°C) component A: < 0,1 (20)
component B: not relevant

Viscosity:
Viscosity [Pa s] (°C) about 70 (23) DIN 53 015
Efflux time 4 mm nozzle [s] above 20 (23) DIN 53 211
Efflux time 8 mm nozzle [s] ---

Solubility [g/l] (°C):
in water component A: insoluble
component B: insoluble
in Organic solvents

pH-value (g/l H₂O; °C): Component A: not relevant
component B: 6 (pure)

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150

Flash point [°C]:	component A: >100 component B: not relevant	DIN 53 213
Ignition temperature [°C]:	not determined	DIN 51 794
Explosive limit [vol%]:	lower: not determined upper: not determined	
Thermic decomposition [°C]	component B: decomposition temperature (SADT)dibenzoyl peroxide>80°C	
Autoignition temperature [°C]:	Component B: > 400°C	ASTM D 2155

10. Stability and reactivity

Conditions to avoid:

At high storage temperature, in component B the dibenzoylperoxide will start decomposing and the generated carbon dioxide will cause the foil-pack to swell. Thus the foilpack will become unserviceable.

Materials to avoid:

None

Hazardous decomposition products:

None, if used in the intended purpose.

11. Toxicological information

The classification takes place according to the determination process in 88/379/EEC. Local contact with eyes causes irritation. Local contact with skin may cause sensitization. (Dibenzoyl peroxide and hydroxypropyle methacrylate)

12. Ecological information

Keep away from drains, surface-water, ground-water and soil.
Class of risk for water: 2

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150

13. Disposal considerations

Our product packaging bears the „Green Spot“ 

Emptied containers can be disposed of via the Dual System in Germany (yellow bin).

Full or partly emptied containers, whose contents have become unusable, e.g. expiry date exceeded or container damaged, must be collected separately and disposed of as special waste, while observing the respective authorities' regulations.

Kind of waste: (EC Directive 93/259/EEC part 2)

On handling over small quantities to communal / municipal collection points:

EAK-No. 200112 (.....adhesives and sythetik resins)

Disposal of large quantities via disposal companies:

EAK-No. 080402 (old adhesives and sealants containing no halogenated solvents)

Recommandation to avoid special waste: Dispense contents of unusable containers through the static mixer in the proper way. The cured adhesive is inert and may be disposed of in remaining waste. The empty packaging can be put in the „Yellow bin“.

14. Transport information

GGVSee/IMDG-Code: --
GGVE/GGVS: --
UN-Nr.: --
RID/ADR: --
ICAO/IATA/DGR: --
ADNR: --

No dangerous good in the meaning of the above regulations.

15. Regulatory information

Classification according to guidelines 67/548 EEC and 88/379 EEC as well as to their supplements.

HIT is an oxidizing and irritating preparation.

Observe the usual precautionary measures for handling chemicals.

Labelling:

Symbols:

**Danger identification** Xi, irritantO , oxidizing
contains dibenzoyl peroxide,
hydroxypropyle methacrylate

Company: Hilti

Phone:

Telefax:

Product name: Hilti HIT-HY150**Risk-phrases:**

- R 36 Irritating to eyes.
R43 May cause sensitization by skin contact.

Safety phrases:

- S3 Keep in a cool place.
S37/39 Wear suitable gloves and eye protection.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28 After contact with skin, wash immediately with plenty of soap and water.

Further information: Observe: Council Directive 94/33/EC of 22 June 1994 on the protection of young people at work § 2 and / or (DE) children and young persons act § 22, § 29

16. Other information

Body issuing data sheet:
Hilti Entwicklung Elektrowerkzeuge GmbH
Hiltistrasse 26 D-86916 Kaufering Tel: 0049 8191 906310

All information and recommendation contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

Job/Application Reference

30-May-11



Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
40548	09-10	Galaxy Mega Resort	YUEAN (MACAU) ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	cable bracket / tray / trucking fixing
40264	09-10	Hennessy Center Redevelopment	REX DECORATION LTD		Injectable mortar HIT-HY 150 330/2	rebar fastening
40411	09-10	SHK Development, Tseung Kwan O (Area 56)	LIK KWAN ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
40555	09-10	Hotel Grand Lisboa Development	UNICON ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	machine fixing
40903	09-10	KCRC Tai Wai Depot	PAUL Y. BUILDERS LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
40601	09-10	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GENYIELD CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
40670	09-10	Pak Shek Kok Development	CHUN WAH CONSTRUCTION AND		Injectable mortar HIT-HY 150 500/2	road barrier
40671	09-10	SHK Development, Tseung Kwan O (Area 56)	ORIENTFUNDS PRECAST LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
40737	09-10	Galaxy Mega Resort	CREATOR'S METAL & GLASS ENG (MACAU)		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
40745	09-10	Galaxy Mega Resort	CREATOR'S METAL & GLASS ENG (MACAU)		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
40755	09-10	Galaxy Mega Resort	KARIPAK ENGINEERING & MATERIAL		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
40809	09-10	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	ASIA LANDSCAPING (MACAO) LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
40109	05-10	The Venetian Casino Resort (Parcel 1)	PREMIER INTERIOR LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
40081	05-10	Galaxy Mega Resort	L & L DIGITAL TECHNOLOGY CO. LTD		Injectable mortar HIT-HY 150 500/2	electrical services fixing
40071	05-10	MTR West Island Line	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening

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Job/Application Reference

30-May-11



Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
40112	05-10	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	CONSTRUCOES E OBRAS PUBLICAS		Injectable mortar HIT-HY 150 500/2	rebar fastening
40001	04-10	Galaxy Mega Resort	MERCURIO SERVICOS DE ENGENHARIA		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
39917	03-10	SHK, Tuen Mun Station (TMTL 447)	MAEDA-CREC-SELI-JOINT VENTURE		Injectable mortar HIT-HY 150 330/2	rebar fastening
39776	02-10	Tung Ying Re-development, Nathan Road	REX DECORATION LTD		Injectable mortar HIT-HY 150 500/2	catch fence fixing
39650	01-10	PTM Projects - China State	TEAMBO ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	catch fence fixing

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Job/Application Reference

24-Feb-10



Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
39575	12-09	PTM Projects - Yau Lee	HUNG'S ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
39457	11-09	Wynn Macau Casino	KPA ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
39322	10-09	City of Dreams Resort	SUCCESS BASE ENGINEERING (MACAU)		Injectable mortar HIT-HY 150 500/2	decoration fixing
39248	10-09	PTM Projects - Sun Hung Kai	XIN-YI (HONG KONG) LTD		Injectable mortar HIT-HY 150 500/2	window fixing
39170	10-09	PTM Projects - Hip Hing	PENTA-OCEAN CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
39140	10-09	KCRC Tai Wai Depot	HANG TAK ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
39049	09-09	Galaxy Mega Resort	MACAO JIANGHE CURTAIN-WALL ENG		Injectable mortar HIT-HY 150 500/2	window fixing
39010	09-09	PTM Projects - China State	EAST GAIN METAL WORKS MACHINERY CO.		Injectable mortar HIT-HY 150 500/2	metal gate fixing
38569	08-09	City of Dreams Resort	LAI HENG KONG CHENG		Injectable mortar HIT-HY 150 500/2	decoration fixing
38793	08-09	Wynn Macau Casino	ENGENHARIA HUNG YIP		Injectable mortar HIT-HY 150 500/2	steel hanger fixing
38720	08-09	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
38722	08-09	Airport	CHEER MAX ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
38268	07-09	City of Dreams Resort	PAT DAVIE (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	decoration fixing
38480	07-09	Four Seasons Hotel, Macau (Parcel 2)	ARTSCAPES (FAR EAST) LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
38342	07-09	Union Square 7, Kowloon Station	KEIO ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	electrical services fixing
38056	06-09	KCRC Tai Wai Depot	SI-O ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
38131	06-09	Airport	D K ENG LTD		Injectable mortar HIT-HY 150 500/2	gondola fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
38205	06-09	The Venetian Casino Resort (Parcel 1)	ARTSCAPES (FAR EAST) LIMITED		Injectable mortar HIT-HY 150 500/2	block work fixing
38135	06-09	Airport	LEE WO CONSTRUCTION ENG CO LTD		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
37953	05-09	City of Dreams Resort	TONG KEE ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
37841	05-09	City of Dreams Resort	KOON FUNG ENGINEERING COMPANY		Injectable mortar HIT-HY 150 500/2	hand rail fixing
37818	05-09	PTM Projects - Hip Hing	CHUEN KEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	glass rail fixing
37794	05-09	City of Dreams Resort	COMPANHIA PIU HENG LONG (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
37965	05-09	Four Seasons Hotel, Macau (Parcel 2)	ARTSCAPES (FAR EAST) LIMITED		Injectable mortar HIT-HY 150 500/2	metal gate fixing
37738	05-09	PTM Projects - Gammon	KPA ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
37682	04-09	Galaxy Star World Hotel, Macau	DECORACAO CHEONG KONG	Meinhardt	Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
37654	04-09	City of Dreams Resort	DDL CONTRACTING (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	overhead line fixing
37335	03-09	PTM Projects - Gammon	G & M ENG CO LTD		Injectable mortar HIT-HY 150 500/2	glass rail fixing
37130	03-09	City of Dreams Resort	ARS TELECOM LIMITED		Injectable mortar HIT-HY 150 500/2	metal fixing
37131	03-09	City of Dreams Resort	BIWATER MAN LEE LTD		Injectable mortar HIT-HY 150 500/2	metal fixing
37172	03-09	Four Seasons Hotel, Macau (Parcel 2)	APGRC (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
37209	03-09	PTM Projects - Hsin Chong	HOP HING IRON WRK&CONST CO LTD		Injectable mortar HIT-HY 150 500/2	steel hanger fixing
37223	03-09	City of Dreams Resort	LUEN YICK TAI CONSTRUCTION (MACAU)		Injectable mortar HIT-HY 150 500/2	rebar fastening

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<u>Ref No</u>	<u>Date</u>	<u>Project</u>	<u>Contractor</u>	<u>Consulting Engineer</u>	<u>Product</u>	<u>Application</u>
37413	03-09	City of Dreams Resort	ARS TELECOM LIMITED		Injectable mortar HIT-HY 150 500/2	broadband equipment fixing
37155	03-09	Oceanus Entertainment Complex	MERCURIO SERVICOS DE ENGENHARIA		Injectable mortar HIT-HY 150 500/2	rebar fastening
36960	02-09	City of Dreams Resort	TONG KEE ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	hanger fixing
36974	02-09	PTM Projects - Sun Hung Kai	HANG CHUN METAL WORKS LTD.		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
36904	02-09	Four Seasons Hotel, Macau (Parcel 2)	YUANDA ALUMINIUM INDUSTRY		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
36900	02-09	One Central Macau	URC - PROJECTS MANAGEMENT (MACAU),		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
36884	02-09	One Central Macau	OFIC FERRAGENS OU SON		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
36878	02-09	City of Dreams Resort	TONG KEE ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
36649	01-09	PTM Projects - Sun Hung Kai	HANG CHUN METAL WORKS LTD.		Injectable mortar HIT-HY 150 330/2	cladding / pre-cast panel fixing

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Job/Application Reference

27-Jul-09



Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
33739	12-08	Wynn Macau Casino	Leighton-China State Joint Venture		Injectable mortar HIT-HY 150 500/2	rebar fastening
33363	12-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
33939	12-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
33354	12-08	PTM Projects - Hsin Chong	HSIN CHONG CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
33978	12-08	KCRC Tai Wai Depot	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
33970	12-08	PTM Projects - Shui On	SHUI ON BUILDING CONTRACTORS LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
33567	12-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
33784	12-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
33871	12-08	City of Dreams Resort	VAFORD CONTRACTING CO LTD		Injectable mortar HIT-HY 150 500/2	block work fixing
33609	12-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Injectable mortar HIT-HY 150 500/2	hand rail fixing
33795	12-08	Airport	IHI (HK) LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32481	11-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32185	11-08	One Grantai	HOBBS CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32463	11-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32546	11-08	City of Dreams Resort	ENGENHARIA HUNG YIP		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32474	11-08	Airport	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
32879	11-08	PTM Projects - E-man	HINGSKING BLDG MAT'L & ENG LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
31980	11-08	PTM Projects - Sun Hung Kai	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	decoration fixing
32297	11-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32290	11-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
31994	11-08	PTM Projects - Gammon	REX DECORATION LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32612	11-08	One Central Macau	PERMASTEELISA MACAU LIMITED		Injectable mortar HIT-HY 150 500/2	curtain wall fixing
32141	11-08	MGM Grand Macau	NGAN KUI ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32730	11-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32094	11-08	City of Dreams Resort	RAYBO ENG CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32982	11-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	IU HO CONST. ENG. CO. LTD.		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
32866	11-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
31970	11-08	PTM Projects - China State	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32396	11-08	Airport	GOLD POWER ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32283	11-08	PTM Projects - Hsin Chong	HSIN CHONG CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32664	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GOLDENWALL ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
32675	11-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	REX ENGINEERING (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
32513	11-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32892	11-08	PTM Projects - Paul Y	PAUL Y. GENERAL CONTRACTORS LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
32407	11-08	PTM Projects - Hip Hing	HOP HING CONST & ENG CO		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
32910	11-08	KCRC	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
32521	11-08	PTM Projects - Hip Hing	BRIGHT LINK ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
32903	11-08	PTM Projects - Shui On	SHUI ON BUILDING CONTRACTORS		Injectable mortar HIT-HY 150 500/2	rebar fastening
31748	10-08	PTM Projects - Shui On	SHUI ON BUILDING CONTRACTORS		Injectable mortar HIT-HY 150 500/2	rebar fastening
30964	10-08	MGM Grand Macau	NGAN KUI ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
31242	10-08	Airport	GOLD POWER ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
31329	10-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
31121	10-08	PTM Projects - Hip Hing	BARBICAN CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
31783	10-08	City of Dreams Resort	COMPANHIA DE OBRAS DE CONSTRUCAO		Injectable mortar HIT-HY 150 500/2	metal gate fixing
31705	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	VAFORD CONTRACTING CO LTD		Injectable mortar HIT-HY 150 500/2	hand rail fixing
31133	10-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
31485	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	HINGSKING BLDG MAT'L & ENG LTD		Injectable mortar HIT-HY 150 500/2	curtain wall fixing
31508	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	REX ENGINEERING (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
31721	10-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
31128	10-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
31676	10-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GREAT HARVEST CONSTRUCTION LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
31943	10-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	IU HO CONST. ENG. CO. LTD.		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
31146	10-08	PTM Projects - E-man	S'WAH ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	pipe ring fixing
31120	10-08	PTM Projects - E-man	E.MAN CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
31960	10-08	PTM Projects - Sun Hung Kai	KIN LUEN CONSTRUCTION ENGINEERING		Injectable mortar HIT-HY 150 500/2	rebar fastening
31549	10-08	Airport	IHI (HK) LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
29765	09-08	City of Dreams Resort	D K ENG LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
29852	09-08	One Grantai	HOBBS CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
29676	09-08	PTM Projects - China State	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
30771	09-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	IU HO CONST. ENG. CO. LTD.		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
30572	09-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
29989	09-08	PTM Projects - Hip Hing	BRIGHT LINK ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
30196	09-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
29832	09-08	MGM Grand Macau	NGAN KUI ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
30606	09-08	KCRC	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
30421	09-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
30506	09-08	The Venetian Casino Resort (Parcel 1)	DAVID DECORATION (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	decoration fixing
30181	09-08	Airport	DRAGAGES HONG KONG LIMITED		Injectable mortar HIT-HY 150 500/2	structural steel / I-beam fixing
30175	09-08	Dream City Phase 1	ABLE ENG CO LTD	W & O / Mott Connell / PBA	Injectable mortar HIT-HY 150 500/2	rebar fastening
29474	08-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
28964	08-08	PTM Projects - Sun Hung Kai	S'WAH ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	pipe ring fixing
29236	08-08	Four Seasons Hotel, Macau (Parcel 2)	ARTSCAPES (FAR EAST) LIMITED		Injectable mortar HIT-HY 150 500/2	window fixing
28788	08-08	MGM Grand Macau	NGAN KUI ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
29113	08-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
29338	08-08	PTM Projects - Sun Hung Kai	G & M ENG CO LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
28946	08-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
28658	08-08	PTM Projects - China State	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
29363	08-08	City of Dreams Resort	CHONG SAN INTERIOR DESIGN &		Injectable mortar HIT-HY 150 500/2	decoration fixing
29283	08-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	REX ENGINEERING (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
29228	08-08	Development of Ponte 16	SIGN HOUSE CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
29094	08-08	PTM Projects - Paul Y	BUILD FAME ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
28436	07-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	NEW BASE ENGINEERING CO LIMITED		Injectable mortar HIT-HY 150 500/2	block work fixing
27885	07-08	Airport	RICHWELL ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
28058	07-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
28218	07-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 330/2	steel bracket fixing
28365	07-08	Hotel Grand Lisboa Development	TOPLUS GROUP		Injectable mortar HIT-HY 150 500/2	machine fixing
27853	07-08	PTM Projects - E-man	E.MAN CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
28482	07-08	KCRC	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
28194	07-08	Four Seasons Hotel, Macau (Parcel 2)	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	roofing fixing
27570	07-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	YAU LUEN METAL WORKS LTD		Injectable mortar HIT-HY 150 330/2	steel bracket fixing
28567	07-08	Four Seasons Hotel, Macau (Parcel 2)	APGRC (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
28191	07-08	Four Seasons Hotel, Macau (Parcel 2)	ARTSCAPES (FAR EAST) LIMITED		Injectable mortar HIT-HY 150 500/2	window fixing

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Ref No	Date	Project	Contractor	Consulting Engineer	Product	Application
28075	07-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27707	07-08	MGM Grand Macau	NGAN KUI ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
27868	07-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
28294	07-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
26978	06-08	PTM Projects - E-man	WINLOAD CONST ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27238	06-08	City of Dreams Resort	ASTEL (MACAO) LIMITED		Injectable mortar HIT-HY 150 500/2	machine fixing
27317	06-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GREAT HARVEST CONSTRUCTION LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
27123	06-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
27356	06-08	PTM Projects - Hip Hing	BRIGHT LINK ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27234	06-08	Lai Chi Kok Viaduct (HY/2003/01)	TUNG YAT CONSTRUCTION CO LTD	Maunsell Hyder JV	Injectable mortar HIT-HY 150 500/2	rebar fastening
27090	06-08	One Central Macau	PERMASTEELISA MACAU LIMITED		Injectable mortar HIT-HY 150 500/2	window fixing
27013	06-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
26996	06-08	Dream City Phase 1	ABLE ENG CO LTD	W & O / Mott Connell / PBA	Injectable mortar HIT-HY 150 500/2	rebar fastening
26995	06-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27003	06-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening

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27153	06-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	LEADER INTERNATIONAL ENG LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
27037	06-08	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
27206	06-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27442	06-08	Four Seasons Hotel, Macau (Parcel 2)	APGRC (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
27217	06-08	PTM Projects - Sun Hung Kai	G & M ENG CO LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
26856	06-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
26893	06-08	PTM Projects - Sun Hung Kai	S'WAH ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	pipe ring fixing
27108	06-08	The Venetian Casino Resort (Parcel 1)	MAYSHING ASIA LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
27530	06-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	IU HO CONST. ENG. CO. LTD.		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
27111	06-08	Four Seasons Hotel, Macau (Parcel 2)	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
26582	06-08	KCRC	AH NGAU ENG LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
27363	06-08	PTM Projects - Paul Y	PAUL Y. CONSTRUCTION & ENGINEERING		Injectable mortar HIT-HY 150 500/2	rebar fastening
27361	06-08	PTM Projects - Paul Y	PAUL Y. BUILDERS LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
26270	05-08	City of Dreams Resort	SITU-MINSANG ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	block work fixing
26038	05-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
26065	05-08	Le Royal Arc	GOLDEN RESOURCE ENG. LTD.		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system

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26256	05-08	City of Dreams Resort	ASTEL (MACAO) LIMITED		Injectable mortar HIT-HY 150 500/2	machine fixing
25508	05-08	PTM Projects - Paul Y	YING WAH CONSTRUCTION LTD.		Injectable mortar HIT-HY 150 500/2	rebar fastening
26106	05-08	One Central Macau	HING WAH CONSTRUCTION COMPANY LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
25527	05-08	PTM Projects - Hip Hing	INKA LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
26250	05-08	Lai Chi Kok Viaduct (HY/2003/01)	TUNG YAT CONSTRUCTION CO LTD	Maunsell Hyder JV	Injectable mortar HIT-HY 150 500/2	rebar fastening
26339	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	COMPANHIA DE OBRAS KUONG NGA		Injectable mortar HIT-HY 150 500/2	block work fixing
25933	05-08	PTM Projects - Sun Hung Kai	PERMASTEELISA HONG KONG LTD		Injectable mortar HIT-HY 150 500/2	curtain wall fixing
26224	05-08	Airport	GOLDENWALL ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	glass rail fixing
25870	05-08	PTM Projects - Sun Hung Kai	S'WAH ENGINEERING CO LTD		Injectable mortar HIT-HY 150 500/2	pipe ring fixing
26195	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	SUN FOOK KONG - KUN FAI ENGINEERING		Injectable mortar HIT-HY 150 330/2	rebar fastening
26153	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
26017	05-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
25832	05-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
26492	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	CHOI NAM KEE (MACAU) CONSTRUCTION		Injectable mortar HIT-HY 150 500/2	reinforcement for block wall system
25970	05-08	PTM Projects - E-man	FAT CHEONG CONST CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing

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25810	05-08	PTM Projects - E-man	E.MAN CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
25825	05-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
26037	05-08	PTM Projects - China State	CHINA STATE CONSTRUCTION ENGRG(HK)		Injectable mortar HIT-HY 150 500/2	rebar fastening
26026	05-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
26177	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	LEADER INTERNATIONAL ENG LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
26469	05-08	Four Seasons Hotel, Macau (Parcel 2)	APGRC (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
26341	05-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	GREAT HARVEST CONSTRUCTION LIMITED		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
23878	04-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
24393	04-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	IU HO CONST. ENG. CO. LTD.		Injectable mortar HIT-HY 150 500/2	block work fixing
24038	04-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23786	04-08	PTM Projects - Hip Hing	HOP HING CONST & ENG CO		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
23628	04-08	Airport	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23692	04-08	Airport	RICHWELL ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	Plumbing works fixing
23636	04-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	LINK 200 JOINT VENTURE		Injectable mortar HIT-HY 150 500/2	rebar fastening
23944	04-08	The Venetian Casino Resort (Parcel 1)	PAK KAI ENG CO		Injectable mortar HIT-HY 150 500/2	steel bracket fixing

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23987	04-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 500/2	structural steel / I-beam fixing
24287	04-08	Four Seasons Hotel, Macau (Parcel 2)	APGRC (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
23985	04-08	Four Seasons Hotel, Macau (Parcel 2)	WUI FAI ENG CO LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
24346	04-08	The Venetian Casino Resort (Parcel 1)	VENETIAN MACAU LIMITED		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
24189	04-08	PTM Projects - Hip Hing	BRIGHT LINK ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
24250	04-08	City of Dreams Resort	SAN IO WA CONSTRUCTION		Injectable mortar HIT-HY 150 500/2	rebar fastening
24077	04-08	City of Dreams Resort	ASTEL (MACAO) LIMITED		Injectable mortar HIT-HY 150 500/2	machine fixing
24231	04-08	City of Dreams Resort	KEE YIU ENGINEERING LIMITED		Injectable mortar HIT-HY 150 330/2	rebar fastening
24232	04-08	City of Dreams Resort	KEE YIU ENGINEERING LIMITED		Injectable mortar HIT-HY 150 500/2	rebar fastening
24054	04-08	PTM Projects - Sun Hung Kai	G & M ENG CO LTD		Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
23660	04-08	PTM Projects - Sun Hung Kai	SANFIELD BLDG CONTRACTOR		Injectable mortar HIT-HY 150 500/2	rebar fastening
23740	04-08	PTM Projects - Sun Hung Kai	PERMASTEELISA HONG KONG LTD		Injectable mortar HIT-HY 150 500/2	curtain wall fixing
24412	04-08	One Island East	HOI YEUNG MAN HO ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	catch fence fixing
23778	04-08	PTM Projects - E-man	FAT CHEONG CONST CO LTD		Injectable mortar HIT-HY 150 500/2	steel hanger fixing
24049	04-08	PTM Projects - E-man	FUK LAM ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23652	04-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening

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23360	04-08	PTM Projects - Sun Hung Kai	ASIA ROCK ART LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
22647	03-08	PTM Projects - China State	TEAMBO ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
23084	03-08	Galaxy Star World Hotel, Macau	SON SENG CONSTRUCTION CO	Meinhardt	Injectable mortar HIT-HY 150 500/2	steel hanger fixing
23102	03-08	PTM Projects - Hanison	HANISON CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23069	03-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 500/2	block work fixing
23173	03-08	Four Seasons Hotel, Macau (Parcel 2)	GREAT HARVEST CONSTRUCTION LIMITED		Injectable mortar HIT-HY 150 500/2	fixing the mesh in the slope
23182	03-08	Four Seasons Hotel, Macau (Parcel 2)	TAI FUNG MARBLE ENGINEERING &		Injectable mortar HIT-HY 150 500/2	fixing the mesh in the slope
23086	03-08	PTM Projects - China State	CHINA STATE CONST ENG COR		Injectable mortar HIT-HY 150 500/2	rebar fastening
23166	03-08	The Venetian Casino Resort (Parcel 1)	CHUN WA HONG		Injectable mortar HIT-HY 150 500/2	fixing the mesh in the slope
23011	03-08	Lohas Park Phase 1 & Phase 2	ABLE ENG CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23127	03-08	PTM Projects - Sun Hung Kai	G & M ENG CO LTD		Injectable mortar HIT-HY 150 500/2	glass fencing / balustrade fixing
22843	03-08	PTM Projects - Yau Lee	YAU LEE CONST CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
22832	03-08	PTM Projects - Gammon	GAMMON CONSTRUCTION LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
23139	03-08	Union Square 7, Kowloon Station	KAM KEE STEEL WORKS LTD		Injectable mortar HIT-HY 150 330/2	steel hanger fixing
22640	03-08	Airport	LEUNG MING STAINLESS STEEL		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
22646	03-08	Kowloon Southern Link (KSL - Link200, 300 & 400)	HONG KI ENG LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening

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23122	03-08	PTM Projects - E-man	FUK LAM ENGINEERING LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
22523	02-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	REX ENGINEERING (MACAU) LTD		Injectable mortar HIT-HY 150 500/2	hand rail fixing
22484	02-08	Refurbishment of Ocean Park	W. HING CONSTRUCTION CO LTD	Maunsell	Injectable mortar HIT-HY 150 500/2	rebar fastening
22538	02-08	Lai Chi Kok Viaduct (HY/2003/01)	TUNG YAT CONSTRUCTION CO LTD	Maunsell Hyder JV	Injectable mortar HIT-HY 150 500/2	singage / advertising sign fixing
22514	02-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	LEADER INTERNATIONAL ENG LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
22535	02-08	Airport	AMEN CONSTRUCTION CO LTD		Injectable mortar HIT-HY 150 500/2	rebar fastening
22235	01-08	Four Seasons Hotel, Macau (Parcel 2)	PROJEXASIA (MACAU) LIMITED		Injectable mortar HIT-HY 150 500/2	catch fence fixing
22133	01-08	Four Seasons Hotel, Macau (Parcel 2)	Gammon Bldg Constr (Macau) Ltd		Injectable mortar HIT-HY 150 500/2	rebar fastening
22187	01-08	Airport Sky pier	KAN KEE ENG LTD	OAP / Mott Connell	Injectable mortar HIT-HY 150 500/2	steel hanger fixing
22178	01-08	Sau Mau Ping Estate Redevelopment	HANISON CONST CO LTD	Housing Authority	Injectable mortar HIT-HY 150 500/2	rebar fastening
22302	01-08	Shangri-la and Traders HotelsSheraton and St. Regis Hotels (Parcel 5&6)	CHOI NAM KEE (MACAU) CONSTRUCTION		Injectable mortar HIT-HY 150 500/2	block work fixing
22218	01-08	Four Seasons Hotel, Macau (Parcel 2)	COMPANHIA DE OBRAS KUONG NGA		Injectable mortar HIT-HY 150 500/2	hanger fixing
22213	01-08	The Venetian Casino Resort (Parcel 1)	MAN SHING ENGINEERING (MACAO) LTD		Injectable mortar HIT-HY 150 500/2	hanger fixing
22287	01-08	The Venetian Casino Resort (Parcel 1)	SUNDUST LIMITADA		Injectable mortar HIT-HY 150 500/2	steel bracket fixing
22173	01-08	Public Housing Fanling Area 36 Phase 2	CHINA STATE CONST ENG COR	Housing Authority	Injectable mortar HIT-HY 150 500/2	rebar fastening

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22009	01-08	Hong Kong Cyberport	UNITED RELIANCE CORP LTD	Siu Yin Wai & Associates	Injectable mortar HIT-HY 150 500/2	cladding / pre-cast panel fixing
22181	01-08	Yeung Uk Road Redevelopment	CHINA STATE CONST ENG COR	C M Wong / Mot Connell	Injectable mortar HIT-HY 150 500/2	rebar fastening

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