

# **Lafayette Hydraulic Hand Dynamometer**

## **User Instructions**



3700 Sagamore Parkway North  
Lafayette, IN 47904 USA  
Tel: (765) 423-1505 • (800) 428-7545  
Fax: (765) 423-4111  
[info@lafayetteinstrument.com](mailto:info@lafayetteinstrument.com)  
[www.lafayetteinstrument.com](http://www.lafayetteinstrument.com)

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## **Description**

The Lafayette Hand Dynamometer offers many features for both routine screening work and for evaluating hand trauma and disease.

### **Dual-Scale Readout**

Our Dynamometer displays grip force in pounds (200lbs max) and kilograms (90kg max).

### **Peak-Hold Needle**

For convenience and easy recording, the Lafayette Hand Dynamometer automatically retains the highest reading on a special peak-hold needle. This reading remains on the gauge until the examiner resets it.

### **Accurate and Reproducible**

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### **Adjustable Handle**

To accommodate various size hands, the Lafayette Hand Dynamometer handle adjusts to five grip positions: from 1 3/8 to 3 3/8 inches, in half-inch increments.

## **Benefits**

Detection of the Malingering. For various reasons, some patients will be reluctant to exert maximum effort in grip force evaluation. Repeated tests after short rest periods will detect the malingering patient. To determine whether the patient is exerting maximum effort:

- Test grip in the usual manner, taking readings with the ahnd grip in all postitions on the dynamometer.
- Test the normal hand, followed by the injured hand, allowing the subject to see readings.
- After about five minutes, repeat the test.

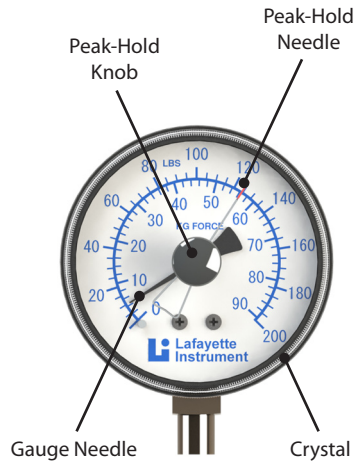
Usually, if the subject has carried out the test will full effort, there will be less than 10% variation in results for various grip positions. But if he has exerted less-than-full-effort, there will be a larger, erratic variation, sometimes as much as 100% between the two tests.

## Operation

When you use the Lafayette Hand Dynamometer, please remember that it is a precision instrument and its accuracy can be impaired by abuse. Have the subject use the wrist safety strap to minimize the chance of dropping the dynamometer.

### To use the dynamometer

1. Set the adjustable handle to the desired spacing. (Before moving the handle from one position to another, note that the handle clip is located at the lower (furthest) post from the gauge. If the handle is not replaced in the correct position, the readings will not be accurate.)
2. Rotate the red peak-hold needle counterclockwise to 0.
3. Let the subject arrange the instrument so that it fits in his hand comfortably. Ask him to squeeze with his maximum strength. The peak-hold needle will automatically record the highest force he has exerted.
4. After the subject has used the instrument, record the reading.
5. Reset the peak-hold needle to zero before recording new readings.



### Suggested Standard Procedures

1. Sit or stand comfortably
2. Shoulder adducted and neutrally rotated
3. Elbow flexed to 90 degrees
4. Forearm in neutral position
5. Wrist in neutral position
6. Each test should be repeated 3 times
7. Use the average as the recorded result

### Suggested Interfering Factors

The following factors have shown positive correlation with grip strength:

1. Weight
2. Hand width
3. Height
4. Mesomorphy

**Table: Average Grip-Strength vs Age**

Age	Hand	Males		Females	
		Mean	SD	Mean	SD
6-7	R	32.5	4.8	28.6	4.4
	L	30.7	5.4	27.1	4.4
8-9	R	41.9	7.4	35.3	8.3
	L	39.0	9.3	33.0	6.9
10-11	R	53.9	9.7	49.7	8.1
	L	48.4	10.8	45.2	6.8
12-13	R	58.7	15.5	56.8	10.6
	L	55.4	16.9	50.9	11.9
14-15*	R	77.3	15.4	58.1	12.3
	L	64.4	14.9	49.3	11.9
16-17*	R	94.0	19.4	67.3	16.5
	L	78.5	19.1	56.9	14.0
18-19*	R	108.0	24.6	71.6	12.3
	L	93.0	27.8	61.7	12.5
20-24	R	121.0	20.6	70.4	14.5
	L	104.5	21.8	61.0	13.1
25-29	R	120.8	23.0	74.5	13.9
	L	110.5	16.2	63.5	12.2
30-34	R	121.8	22.4	78.7	19.2
	L	110.4	21.7	68.0	17.7
35-39	R	119.7	24.0	74.1	10.8
	L	112.9	21.7	66.3	11.7
40-44	R	116.8	20.7	70.4	13.5
	L	112.8	18.7	62.3	13.8
45-49	R	109.9	23.0	62.2	15.1
	L	100.8	22.8	56.0	12.7
50-54	R	113.6	18.1	65.8	11.6
	L	101.9	17.0	57.3	10.7
55-59	R	101.1	26.7	57.3	12.5
	L	83.2	23.4	47.3	11.9
60-64	R	89.7	20.4	55.1	10.1
	L	76.8	20.3	45.7	10.1
65-69	R	91.1	20.6	49.6	9.7
	L	76.8	19.8	41.0	8.2
70-74	R	75.3	21.5	49.6	11.7
	L	64.8	18.1	41.5	10.2
75+	R	65.7	21.0	42.6	11.0
	L	55.0	17.0	37.6	8.9

\* The mean scores for individuals, aged 14-19 years, may be slightly low (0-10 lb lower than they should be) due to instrument error detected after the study.

## **Service Tips**

The Lafayette Hand Dynamometer is designed to provide reliable service, with minimum maintenance, over a period of many years. To make sure the instrument is reading accurately, it's a good idea to make a few checks, occasionally, as listed below.

### **Posts**

Remove adjustable handle to check that each post moves up and down freely on its guide (the part that the post bears on), even when you exert pressure on the side of the post. About once a year, place a small amount of grease on the two guides. If excessive friction exists between the post and guide, return the dynamometer for service.

### **Hydraulics**

To check the hydraulic mechanism, first remove the adjustable handle. While watching the top post, push down on the bottom post. Normally, both should travel about 1/8", with top and bottom posts travelling in opposite directions. Travel less than 1/16", indicates a probable leak in the hydraulic system, which requires service.

### **Handle**

Grasp the instrument normally and look carefully at the way the forks of the adjustable handle are supported on the posts. Each fork should touch the post at approximately its midpoint. If this is not the case, return the instrument for adjustment.

### **Peak-Hold Needle**

Check for excessive friction in the peak-hold assembly by turning the peak-hold knob counterclockwise. If the peak-hold needle deflects the gauge needle, return the gauge for service.

If the peak-hold needle is knocked off its support pin, it can readily be repositioned. Unscrew the crystal and turn it upside down. Locate the brass pin in the center of the crystal (the pin is part of the chrome knob on the outside of the crystal). Locate the slot on the brass pin and place the peak-hold needle into this slot.

### **Calibration**

The instrument is calibrated at the factory by loading it at the center with weight and making the appropriate adjustment in the gauge. It is not recommended that the user perform this operation, but rather the instrument be returned for calibration. The calibration should be checked on a regular, annual basis. If the instrument has been dropped or there is some particular reason to suspect that the calibration is in error, the instrument should be serviced immediately.

## **References**

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- Mathiowetz, V., Weber, K., Volland, G., Kashman, N., "Reliability and Validity of Grip and Pinch Strength Evaluations," *The Journal of Hand Surgery*, 9A: 22-26, 1984.

## **Notes**

Write any user notes here for your convenience.

# Terms and Conditions

## LIC Worldwide Headquarters

Toll-Free: (800) 428-7545 (USA only)

Phone: (765) 423-1505

Fax: (765) 423-4111

Email: [sales@lafayetteinstrument.com](mailto:sales@lafayetteinstrument.com)

[export@lafayetteinstrument.com](mailto:export@lafayetteinstrument.com) (Outside the USA)

## Mailing Address:

Lafayette Instrument Company

PO Box 5729

Lafayette, IN 47903, USA

## Lafayette Instrument Europe:

Phone: +44 1509 817700

Fax: +44 1509 817701

Email: [eusales@lafayetteinstrument.com](mailto:eusales@lafayetteinstrument.com)

## Phone, Fax, Email or Mail-in Orders

All orders need to be accompanied by a hard copy of your purchase order. All orders must include the following information:

- Quantity
- Part Number
- Description
- Your purchase order number or method of pre-payment
- Your tax status (include tax-exempt numbers)
- Shipping address for this order
- Billing address for the invoice we'll mail when this order is shipped
- Signature and typed name of person authorized to order these products
- Your telephone number
- Your email address
- Your FAX number

## Domestic Terms

There is a \$50 minimum order. Open accounts can be extended to most recognized businesses. Net amount due 30 days from the date of shipment unless otherwise specified by us. Enclose payment with the order; charge with VISA, MasterCard, American Express, or pay COD. We must have a hard copy of your purchase order by mail, E-mail or fax. Students, individuals and private companies may call for a credit application.

## International Payment Information

There is a \$50 minimum order. Payment must be made in advance by draft drawn on a major US bank; wire transfers to our account; charge with VISA, MasterCard, American Express, or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

## Exports

If ordering instrumentation for use outside the USA, please specify the country of ultimate destination, as well as the power requirements (110V/60Hz or 220V/50Hz). Some model numbers for 220V/50Hz will have a "C" suffix.

## Quotations

Quotations are supplied upon request. Written quotations will include the price of goods, cost of shipping and handling, if requested, and estimated delivery time frame. Quotations are good for 30 days, unless otherwise noted. Following that time, prices are subject to change and will be re-quoted at your request.

## Cancellations

Orders for custom products, custom assemblies or instruments built to customer specifications will be subject to a cancellation penalty of 100%. Payment for up to 100% of the invoice value of custom products may be required in advance. Cancellation for a standard Lafayette Instrument manufactured product once the product has been shipped will normally be assessed a charge of 25% of the invoice value, plus shipping charges. Resell items, like custom products, will be subject to a cancellation penalty of 100%.

## Exchanges and Refunds

Please see the cancellation penalty as described above. No item may be returned without prior authorization of Lafayette Instrument Company and a completed Return Form. A copy of the Return Form or your assigned Return # (you will receive this via email after submitting the form) must be included with the returned goods. The merchandise should be packed well and fully insured. Unopened merchandise may be returned prepaid within thirty (30) days after receipt of the item and in the original shipping carton. Collect shipments will not be accepted. Returned products must be in saleable condition, and credit is subject to inspection of the merchandise.

## Repairs

**Instrumentation may not be returned without prior authorization by Lafayette Instrument Company and a completed Return Form. When you**

**complete the Form, or call Lafayette Instrument, you will receive a Return #. Your Return # number will be good for 30 days. Address the shipment to:**

Lafayette Instrument Company  
3700 Sagamore Parkway North  
Lafayette, IN 47904, USA.

Shipments cannot be received at the LIC PO Box. Items should be packed well, insured for full value, and returned along with a copy of the Return Form or the Return #. An estimate of repair will be given prior to completion ONLY if requested in an enclosed cover letter. We must have a completed purchase order by mail or fax, or repair work cannot commence for non-warranty repairs.

## Damaged Goods

Damaged instrumentation should not be returned to Lafayette Instrument prior to a thorough inspection. If a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. If damage is not detected at the time of delivery, contact the carrier/shipper and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for repair or replacement of the damaged merchandise.

## Limited Warranty

Lafayette Instrument Company warrants equipment manufactured by the company to be free of defects in material and workmanship for a period of one year from the date of shipment, except as provided hereinafter. The original manufacturer's warranty will be honored by Lafayette Instrument for items not manufactured by Lafayette Instrument Company, i.e. resell items. This assumes normal usage under commonly accepted operating parameters and excludes consumable products.

Warranty period for repairs or used instrumentation purchased from Lafayette Instrument is 90 days. Lafayette Instrument Company agrees either to repair or replace, at its sole option and free of part charges to the customer, instrumentation which, under proper and normal conditions of use, proves to be defective within the warranty period. Warranty for any parts of such repaired or replaced instrumentation shall be covered under the same limited warranty and shall have a warranty period of 90 days from the date of shipment or the remainder of the original warranty period whichever is greater. This warranty and remedy are given expressly and in lieu of all other warranties, expressed or implied, of merchantability or fitness for a particular purpose and constitutes the only warranty made by Lafayette Instrument Company.

Lafayette Instrument Company neither assumes nor authorizes any person to assume for it any other liability in connection with the sale, installation, service or use of its instrumentation. Lafayette Instrument Company shall have no liability whatsoever for special, consequential, or punitive damages of any kind from any cause arising out of the sale, installation, service or use of its instrumentation. All products manufactured by Lafayette Instrument Company are tested and inspected prior to shipment. Upon prompt notification by the Customer, Lafayette Instrument Company will correct any defect in warranted equipment of its manufacture either, at its option, by return of the item to the factory, or shipment of a repaired or replacement part. Lafayette Instrument Company will not be obliged, however, to replace or repair any piece of equipment, which has been abused, improperly installed, altered, damaged, or repaired by others. Defects in equipment do not include decomposition, wear, or damage by chemical action or corrosion, or damage incurred during shipment.

## Limited Obligations Covered by this Warranty

1. In the case of instruments not of Lafayette Instrument Company manufacture, the original manufacturer's warranty applies.
2. Shipping charges under warranty are covered only in one direction. The customer is responsible for shipping charges to the factory if return of the part is required.
3. This warranty does not cover damage to components due to improper installation by the customer.
4. Consumable and/or expendable items, including but not limited to electrodes, lights, batteries, fuses, O-rings, gaskets, and tubing, are excluded from warranty.
5. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
6. If the original invoice for the instrument is issued to a company that is not the company of the end user, and not an authorized Lafayette Instrument Company distributor, then all requests for warranty must be processed through the company that sold the product to the end user, and not directly to Lafayette Instrument Company.

## Export License

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