BROOKFIELD ENGINEERING LABORATORIES, INC.
11 Commerce Boulevard • Middleboro, MA 02346 USA

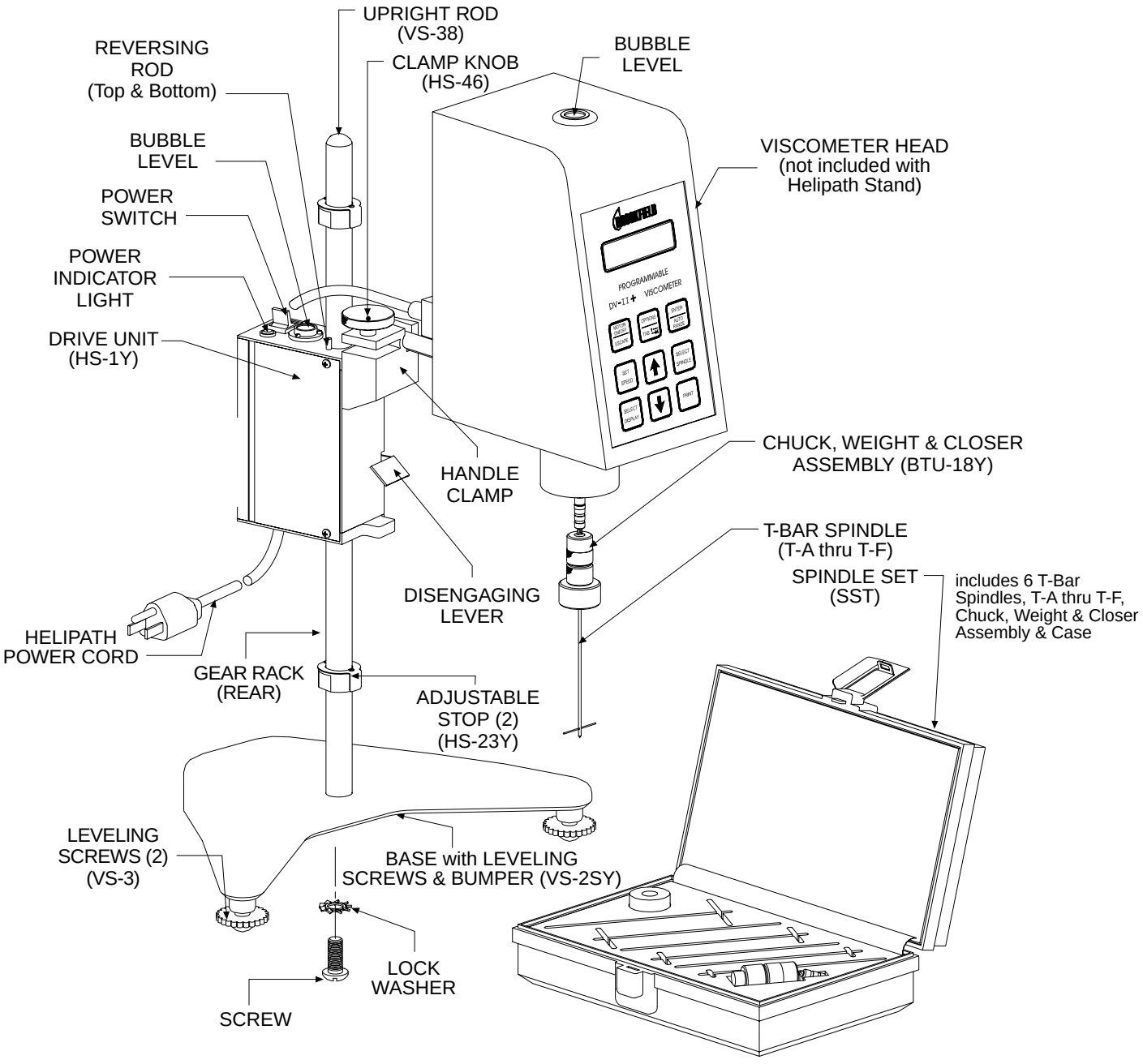
Model D Helipath Stand

Assembly & Operating Instructions
Manual No. M/82-100-G0702

TEL 508-946-6200 or 800-628-8139 FAX 508-946-6262
www.brookfieldengineering.com

ISO9001 CERTIFIED

Model D Helipath Stand Parts Identification



Check carefully to see that all components are received with no concealed damage.

1 drive unit (HS-1Y)
1 base (VS-2SY)
2 leveling screws (VS-3)
1 upright rod (VS-38)
2 adjustable stops (HS-23Y)
6 T-bar spindles (T-A — T-F)
1 chuck/closer/weight assembly (BTU-18Y)
1 spindle box (TU-25Y)

Stand Assembly

Insert the upright rod in the base positioning the rack gear facing toward the rear. Thread the screw with lock washer into rod under the base, but do not tighten. Slide one adjustable stop down the upright rod, with locking plate facing up. With the drive unit handle clamp facing forward, depress the disengaging lever and slide the drive unit down the upright rod. Slide the other adjustable stop down the upright rod above the drive unit; again, locking plate of adjustable stop faces up. Center the complete assembly between the base legs and tighten the screw into the upright rod. Install the clamp knob, but do not tighten.

Viscometer Mounting

For Dial models with serial numbers below 200,000, lower the Viscometer power cord into the handle clamp slot with the cord passing to the left of the upright rod. For Digital models and Dial models with serial numbers above 200,000, slide the Viscometer handle core into the handle clamp and tighten the clamp knob. Check the lateral position of the Viscometer relative to the base. Make adjustments and retighten the screw as required to center the Viscometer between the base legs. Referring to the stand bubble level, adjust the base leveling screws until the stand is level. Referring to the Viscometer bubble level, position the Viscometer until the bubble is centered (right to left) and tighten the clamp knob.

CAUTION: Position power cords so they do not interfere with the travel of the drive unit.

Viscometer Operation

With the system assembled and mounted as shown in the illustration, insert the spindle into the chuck before attaching the chuck to the Viscometer. Then connect the chuck/closer/weight assembly, with spindle, to the Viscometer (Note the left-hand coupling threads).

Refer to the Helipath Stand Spindle Ranges sheet and select a T-bar spindle. Slide the spindle into the chuck and tighten. Lower the spindle into the fluid by depressing the handle clamp on the Helipath Drive Unit. Recommended initial spindle immersion is achieved when the cross-bar of the T spindle is 1/4" below the surface of the test material. Push the reversing rod on the drive unit down. Make sure that the drive unit is OFF (the yellow light on the top of the drive unit will not be illuminated).

Turn the Viscometer motor on and allow for one to two revolutions of the spindle before turning on the Helipath Drive Unit which when switched on, will travel 7/8" per minute. Set the adjustable stops to accommodate the travel of the Helipath that will provide the desired penetration of the spindle (recommend 1-1/2"). Turn on the Helipath Drive Unit (the yellow light will now be illuminated). NOTE: Brookfield does not recommend operating the Viscometer at RPMs greater than 12, when using the Helipath Stand Accessory.

Observe the dial reading or % torque display (on Digital Models). Record readings where necessary, keeping in mind that low rotational speeds may produce the best results. In this way, a figure will be obtained for the consistency at equal increments of drop through the material. Operation at low rotational speeds will usually produce optimum readings. Multiple readings should be taken as the T-bar travels through the helical cycle (approximately every 15-20 seconds).

Note: 1) It is recommended that the spindles be cleaned after each measurement.

2) The spindle can be placed anywhere in the sample material's container prior to use, as long as rotation of the spindle is not impeded.

3) It is not recommended to use T-Bar spindles to check calibration of your Viscometer. Use the standard spindles which came with your Viscometer.

Viscometer Range Data

Range Data* (T-Bar Spindles) - applicable to Dial Reading and Digital Viscometers/Rheometers

LV Series	LVF	LVT & LVDV-I+	LVDV-II+**	LVDV-III
Viscosity Range	156 - 156 K	156 - 3,120 K	156 - 9,360 K	156 - 9,360 K
RV Series	RVF	RVT & RVDV-I+ & RVDV-E	RVDV-II+**	RVDV-III
Viscosity Range	2 M - 5 M	2 K - 20 M	2 K - 100 M	2 K - 100 M
HA Series		HAT & HADV-I+ & HADV-E	HADV-II+**	HADV-III
Viscosity Range		4 K - 40 M	4 K - 200 M	4 K - 200 M
HB Series		HBT & HBDV-I+ & HBDV-E	HBDV-II+**	HBDV-III
Viscosity Range		16 K - 160 M	16 K - 800 M	16 K - 800 M

*Ranges are in Centipoise (mPa•s). **Maximum range shown is at 0.1 rpm. K = 1,000 M = 1,000,000

Note: For each range, the first number represents the minimum recommended measurable viscosity (10% of the lowest full scale range of each viscometer).

1cP = 1mPa•s

Spindle Range Data

This **Universal Spindle Range** table lists the Spindle Range Coefficients for all (6) T-bar spindles. Dividing the coefficient number by any rotational speed will give the full scale viscosity range for a Viscometer/Rheometer spindle/speed combination. (The Auto Range key on DV-E, DV-I+, DV-II+ or DV-III+ instruments provides this information in the digital display.)

Spindle	Entry Code	Spindle Range Coefficient			
		LV	RV	HA	HB
T-A	91	18,750	200,000	400,000	1,600,000
T-B	92	37,440	400,000	800,000	3,200,000
T-C	93	93,600	1,000,000	2,000,000	8,000,000
T-D	94	187,200	2,000,000	4,000,000	16,000,000
T-E	95	468,000	5,000,000	10,000,000	40,000,000
T-F	96	936,000	10,000,000	20,000,000	80,000,000

(Analog/Dial Viscometer)

Example: 1) Determine the full scale viscosity range (100% of scale) of a T-C spindle running on an RV Series @ 5 RPM.

$$\text{Full Scale Range} = \frac{\text{Spindle Coefficient}}{\text{Spindle Speed}} = \frac{1{,}000{,}000}{5 \text{ rpm}} = 200{,}000 \text{ cP}$$

2) Determine minimum viscosity range (10% of full scale) at above conditions.

$$\text{Min. Visc. Range} = \frac{\text{Full Scale Range}}{10} = \frac{200{,}000}{10} = 20{,}000 \text{ cP}$$

Note: Maximum operable speed when using Helipath Stand is 10 or 12 RPM depending on speeds available on your viscometer.

Spindle Factors
(for Analog/Dial Viscometers)

SPEED (RPM)	**LVF & LVT** VISCOMETERS SPINDLE NUMBER					
	T-A	T-B	T-C	T-D	T-E	T-F
12	15.6	31.2	78	156	390	780
6	31.2	62.4	156	312	780	1.56K
3	62.4	124.8	312	624	1.56K	3.12K
1.5	124.8	249.6	624	1.248K	3.12K	6.24K
0.6	312	624	1.56K	3.12K	7.8K	15.6K
0.3	624	1.248K	3.12K	6.24K	15.6K	31.2K

SPEED (RPM)	**RVF & RVT** VISCOMETERS SPINDLE NUMBER					
	T-A	T-B	T-C	T-D	T-E	T-F
10	200	400	1K	2K	5K	10K
5	400	800	2K	4K	10K	20K
4	500	1K	2.5K	5K	12.5K	25K
2.5	800	1.6K	4K	8K	20K	40K
2	1K	2K	5K	10K	25K	50K
1	2K	4K	10K	20K	50K	100K
0.5	4K	8K	20K	40K	100K	200K

SPEED (RPM)	**HAT** VISCOMETERS SPINDLE NUMBER					
	T-A	T-B	T-C	T-D	T-E	T-F
10	400	800	2K	4K	10K	20K
5	800	1.6K	4K	8K	20K	40K
2.5	1.6K	3.2K	8K	16K	40K	80K
1	4K	8K	20K	40K	100K	200K
0.5	8K	16K	40K	80K	200K	400K

SPEED (RPM)	**HBT** VISCOMETERS SPINDLE NUMBER					
	T-A	T-B	T-C	T-D	T-E	T-F
10	1.6K	3.2K	8K	16K	40K	80K
5	3.2K	6.4K	16K	32K	80K	160K
2.5	6.4K	12.8K	32K	64K	160K	320K
1	16K	32K	80K	160K	400K	800K
0.5	32K	64K	160K	320K	800K	1.6M

K = 1,000
M = 1,000,000

Spindle	**Crossbar Length - Inches (mm)**
T-A	1.894 (48.1)
T-B	1.435 (36.4)
T-C	1.065 (27.1)
T-D	0.804 (20.4)
T-E	0.604 (15.3)
T-F	0.430 (10.9)

To calculate viscosity in centipoise (cP), multiply the dial reading by the factor corresponding to the viscometer spindle and speed combination utilized.