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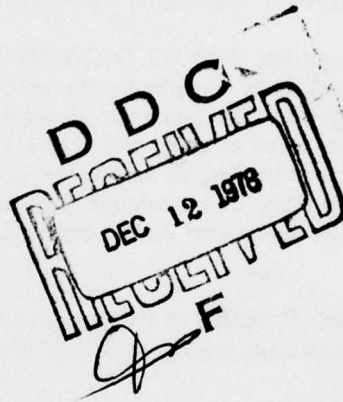
VOL III B

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INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONFIGURATION

VOLUME VI-A - One-Third Octave Band Spectrograms of Wake Single Film Data, Bildup to Baseline

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APPLIED TECHNOLOGY LABORATORY POSITION STATEMENT

In 1975 a wind tunnel test program was conducted in the Boeing-Vertol 20-foot V/STOL Wind Tunnel on a 1/5th-scale UTTAS model to investigate and find solutions for several aerodynamic problems encountered during the UTTAS flight-testing. Specifically, these tests focused upon (a) the structure of the hub/rotor wake in the vicinity of the empennage, (b) the formulation of the ground vortex and its relation to hub loads and fuselage loads during transition, and (c) the occurrence of vibratory air pressures from the blade passing over the fuselage. Only portions of the above-mentioned wind tunnel test data were reduced and analyzed in addressing the flight-test problems of the UTTAS aircraft.

Under Contract DAAJ02-77-C-0020, Boeing-Vertol completed analyses on the data to understand more completely the aerodynamic interactions that are involved and to formulate instructions for the guidance of designers in these respects. The results of these studies are applicable to all existing and future single-rotor/tail rotor helicopters. The data have been segregated according to aerodynamic interactions and associated phenomena/problem areas. From this body of knowledge, a generalized set of design guidelines meaningful to the single-rotor helicopter design concept formulation were developed and are included in these reports.

Mr. Robert P. Smith of the Aeronautical Technology Division, Aeromechanics Technical Area, served as project engineer for this effort.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This is the first of the three volumes of Volume VI containing one-third octave band spectrograms of the model helicopter hub/rotor wake velocities derived from the single-film velocity transducer data. This sub-volume deals with the wake changes as the model is built up to the baseline configuration.			

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PREFACE

The entire report describing the investigation of **INTERACTIONAL AERODYNAMICS OF THE SINGLE-ROTOR HELICOPTER CONFIGURATION** comprises eight numbered volumes bound as 33 separate documents. The complete list of these documents is as follows:

Volume I, Final Report

Volume II, Harmonic Analyses of Airframe Surface Pressure Data

- A - Runs 7-14, Forward Section
- B - Runs 7-14, Mid Section
- C - Runs 7-14, Aft Section
- D - Runs 15-22, Forward Section
- E - Runs 15-22, Mid Section
- F - Runs 15-22, Aft Section
- G - Runs 23-33, Forward Section
- H - Runs 23-33, Mid Section
- I - Runs 23-33, Aft Section

Volume III, Flow Angle and Velocity Wake Profiles in Low-Frequency Band

- A - Basic Investigations and Hubcap Variations
- B - Air Ejector Systems and Other Devices

Volume IV, One-Third Octave Band Spectrograms of Wake Split-Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Explorations
- C - Solid Hubcaps
- D - Open Hubcaps
- E - Air Ejectors
- F - Air Ejectors With Hubcaps; Wings
- G - Fairings and Surface Devices

Volume V, Harmonic Analyses of Hub Wake

Volume VI, One-Third Octave Band Spectrograms of Wake Single Film Data



- A - Buildup to Baseline
- B - Basic Configuration Wake Exploration
- C - Hubcaps and Air Ejectors

Volume VII, Frequency Analyses of Wake Split-Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Explorations
- C - Solid Hubcaps

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- D - Open Hubcaps
- E - Air Ejectors
- F - Air Ejectors With Hubcaps; Wings
- G - Fairings and Surface Devices

Volume VIII, Frequency Analyses of Wake Single Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Exploration
- C - Hubcaps and Air Ejectors

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INTRODUCTION

Volume VI presents spectrograms of the six velocity measurements from the single film transducers which were located outboard on the wake rake to the left and right of the split film transducers. These plots are similar to those of Volume IV E, being machine plotted spectrograms in the one-third octave band format. They relate directly to the standard spectrograms that appear in Volume VIII for the same set of runs.

The sub-volumes of Volume VI display data derived from the following test runs:

Volume VI-A - 149, 150, 160, 156, 158, 159
Volume VI-B - 111 -119, 121,
Volume VI-C - 135, 136, 188, 211, 168, 167, 194, 161, 154, 172,
174, 176, 203, 205, 197

The runs follow the order of the logical arrangement of the Outline of Wake Investigations, Table 1, from which they have been selected. The Table I outline and other material is included for reference and as context to the work of each sub-volume. Table 2, the List of Test Runs, arranges the runs in numerical order and gives pertinent text parameters.

The Index of Rake Positions, Table 3, lists the hot film transducer rake positions in the model coordinate system for each run and its test points. The main feature of Table 3 is the indexing of the test point number to the model water line station and butt line as it varied from run to run. The table groups the runs as they shared the indexing correspondence of point with position. It is emphasized that the runs in a group do not necessarily all share the same number of test points but they do have same correspondence within their respective ranges of test points.

The orientation of the rake is shown pictorially in Figures 1 through 6 for the various test runs. Figure 7 presents a scaled drawing of the model with reference to the three-axis coordinate system. Table 4 lists the center frequency and the upper and lower band limits for each of the numbered one-third octave bands.

TABLE 1

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code	Run No.	Base-line
<u>Build-up to Baseline</u>			
1. Nacelles removed	$K_{13}+H_1-N$	149	150
2. Blades off, rotating hub	$K_{13}-M+H_{1.0}$	160	156
3. " " , non-rotating hub	$K_{13}-M+H_{1.0}$	158	156
4. " " , hub off	$K_{13}-M-H_{1.0}$	159	156
<u>Basic Configuration</u>			
1. <u>Wake Explorations near Empennage</u>			
(a) 15" Long. + traverse at T/R C.L.	K_{11}	111	---
(b) 9" Vert. + " above T/R "	"	112	---
(c) 2" " " in vortex	"	113	---
(d) 8" " " (continue 112)	"	114	---
(e) 13" " " behind stab.	"	115	---
(f) Lateral traverse, left stab. (One T.P. only)	"	116	---
(g) Same continued	"	117	---
(h) Same continued (One T.P. only)	"	118	---
(i) Lateral traverse right stab.	"	119	---
(j) T/R effect on wake	$K_{11}+T_2^0$	121	115
2. <u>Climb/Descent Studies</u>			
(a) Climb 900 FPM	K_{11}	135	---
(b) Descent 800 FPM	"	136	---
<u>Effect Of Hub Caps</u>			
1. <u>Solid Caps on Canister</u>			
(a) 7.6" diam. 2.17" ht. soft Pitch Arms	$K_{11}-H_{1.0}+H_{1.2}$	137	136
(b) 7.6" diam. 2.17" ht. stiff Pitch Arms	$K_{13}+H_{1.2}$	153	156
(b) 7.6" diam. 2.45" ht. flt. test config.	$K_{13}+H_{1.2.1}+I_1$ $+E_{1.0}$	207	188

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>Effect of Hub Caps (Continued)</u>			
2. <u>Solid Caps Raised Above Canister</u>			
(a) 7.6" diam. 2.45" ht. 70" depth, .55 gap	H _{1.2.2} +I ₁ +E _{1.0}	208	188
(b) 10.0" diam. 3.25" ht. 1.55" depth, .50" gap	H _{1.8.1} +I ₁ +E _{1.0}	189	188
(c) 10.0" diam. 4.125" ht. 2.05" depth, .875" gap	H _{1.8.2} +I ₁ +E _{1.0}	190	188
(d) Repeat of 189	" " "	210	188
3. <u>Open Caps Without Underbody</u>			
(a) 10.0" diam. 1.25" gap, blades	H _{1.0.2} +I ₁ +E _{1.0}	193	188/166
(b) " " " gap, no blades	H _{1.0.1} -M	166	158
(c) " " 2.05" gap, blades	H _{1.14.1} +I ₁ +E _{1.0}	211	188
(d) " " 1.75" gap, no blades	H _{1.0.1} -M	165	158
(e) " " 1.87" gap, blades	H _{1.0.3} +I ₁ +E _{1.0}	191	188
(f) 16" diam. 2.00" gap, blades	H _{1.7.1}	168	156/167
(g) " " " gap, no blades	H _{1.7.1} -M	167	158
(h) " " 4.00" gap, blades	H _{1.7.2}	169	156
4. <u>Open Caps with Underbody</u>			
(a) 7.6" diam. 1.25" gap	H _{1.11.1} +I ₂ +E _{1.0}	194	188
(b) " " " " "	H _{1.11.1} +I ₂ +E _{4.0}	198	188
(c) " " " " center post	H _{1.11.2} +I ₂	202	194
(d) 10.0" diam. .5" gap, no blades	H _{1.5.1} -M	164	158
(e) " " 1.25" gap, no blades	H _{1.5.2} -M	161	158
(f) " " 2.0" gap, no blades	H _{1.5.4} -M	163	158
(g) " " 4.0" gap, no blades	H _{1.5.3} -M	162	158
(h) " " 1.25" gap	H _{1.5.2}	154	156/161
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>5. Miscellaneous Hub Covers</u>			
(a) Hub fairing 16" diam.	H _{1.3}	151	150
(b) Wham-O-Frisbee 10" diam.	H _{1.9.0} +E _{1.2}	182	181
(c) Fab. glass Frisbee 16" diam.	H _{1.9.1} +E _{1.2}	183	181
<u>Effect of Air Ejectors</u>			
1. Basic system no blowing	H _{1.0} +E _{1.0}	172	156
2. " " 40 psi	" "	173	156/172
3. " " 150 psi	" "	174	156/172
4. Wide chord shroud 40 psi	H _{1.0} +E _{2.5.1}	175	156/173
5. Wide " " 150 psi	" "	176	156/174
6. W/C shroud w. lip 40 psi	H _{1.0} +E _{3.5.2}	184	156/173
7. Same Contoured Parallel 150 psi	H _{1.0} +E _{3.5.4}	187	156/174
8. Bifurcated duct 0 psi	H _{1.0} +E _{5.0}	203	156
9. " " 40 psi	" "	204	156/203
10. " " 150 psi	" "	205	156/203
<u>Air Ejectors with Open Hub Caps with Underbodies</u>			
1. 7.6" diam. 1.25" gap, 0 psi	H _{1.11.1} +I ₂ +E _{1.0}	194	188/172
2. " " " " 20 psi	" " "	195	188
3. " " " " 40 psi	" " "	196	188/173
4. " " " " 150 psi	" " "	197	188/174
5. " " " " 0 psi	H _{1.11.1} +I ₂ +E _{4.0}	198	188/194
6. " " " " 40 psi	" " "	199	188/196
7. " " " " 150 psi	" " "	200	188/196
8. Same with center post	H _{1.11.2} +I ₂ +E _{4.6}	201	188/200
9. 10.0" diam. 2.0" gap wide ch'd. shroud (150 psi)	H _{1.5.4} +E _{2.5.1}	177	156/176
<u>Effect of Wings and Misc.</u>			
1. Wings			
(a) Nacelle-mounted stub wing	H _{1.0} +W _{1.0} +E _{1.1}	178	181
(b) Single slotted flapped wing	H _{1.0} +W _{3.0} +E _{1.0}	180	181
(c) Double slotted flapped wing	H _{1.0} +W _{2.0} +E _{1.0}	179	181
(d) Boom-mounted stub wing	H _{1.0} +W _{4.0}	186	156
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
2. Crown Fairings			
(a) Flat top behind shaft	$K_{11}+D_1$	140	138
(b) Round top behind shaft	$K_{11}+D_2$	141	138
(c) Extended flat top fairing	H_1+D_4	170	156
(d) Flat top + 16" cap, 4" gap	$H_{1.7.2}+D_4$	171	170
(e) Forward fairing/nacelle fairing	$P_{1.0}$	152	156
3. Surface Devices			
(a) Vortex generators	$K_{11}+VG_{2.1}$	139	138
(b) Guidevane between nacelles	$K_{11}+FV_1$	142	138
(c) Longitudinal strakes	$H_{1.5.3}+S_4$	155	156
(d) 14% porosity spoiler	$K_{11}+X_1$	143	138
*Basic Code is K13 unless noted otherwise.			

TABLE 2
LIST OF TEST RUNS
BASIC INVESTIGATIONS OF THE HUB WAKE

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
111	K ₁₁ /15" Long. wake traverse at TR center line	80	1433/0	8	6.0	-2.0	∞	Off
112	" /9" Vert. wake traverse above TR center line	"	"	"	"	"	"	"
113	" /2" Vert traverse through MR vortex	"	"	"	"	"	"	"
114	" /8" Vert. traverse below TR center line	"	"	"	"	"	"	"
115	" /13" Vert. traverse behind stabilizer	"	"	"	"	"	"	"
116	" /Lateral traverse - left stabilizer	"	"	"	"	"	"	"
117	" /116 continued	"	"	"	"	"	"	"
118	" /116 continued	"	"	"	"	"	"	"
119	" /Lateral traverse - right stabilizer	"	"	"	"	"	"	"
121	K ₁₁ +T ₂ /Effect of tail rotor flow on wake	"	1433/4500	"	"	"	"	On
135	K ₁₁ /Wake in 900 fpm climb	"	"	"	-6.0	-4.5	"	Off
136	" /Wake in 800 fpm descent	"	"	"	6.0	-2.0	"	"

TABLE 2 (CONTINUED)

LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
137	K ₁₁ -H _{1.0} +H _{1.2} /Effect of 7.6 inch diam. solid hub cap	80	1433/0	8	6	-3.8	∞	Off
138	K ₁₁ /Repeat of base run	"	"	"	"	"	"	"
139	K ₁₁ +VG _{2.1} /Effect of vortex generators on aft crown	"	"	"	"	"	"	"
140	K ₁₁ +D ₁ /Flat-topped "doghouse" fairing on aft crown	"	"	"	"	"	"	"
141	K ₁₁ +D ₂ /Rounded-top fairing	"	"	"	"	"	"	"
142	K ₁₁ +FV ₁ /Deflection vane on crown between nacelles	"	"	"	"	"	"	"
143	K ₁₁ +X ₁ /Variable porosity spoiler	"	"	"	"	"	"	"
149	K ₁₃ +H _{1-N} ₁ /Effect of nacelles off also add stiff pitch arms (K ₁₃)	60	1075/0	4.5	"	"	"	"
150	K ₁₃ +H ₁ /60 knot baseline	"	"	"	"	"	"	"
151	K ₁₃ +H _{1.3} /16 inch diam. helmet fairing	"	"	"	"	"	"	"
152	K ₁₃ +P _{1.0} /Pylon and intake fairings	80	1433/0	8	"	"	"	"
153	K ₁₃ +H _{1.2} /Repeat 137 with K ₁₃ pitch arms	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)

LIST OF TEST RUNS

EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
154	K ₁₃ +H _{1.5.2} /10" open hub cap, 7" underbody, 1.25" gap	80	1433/0	8	6	-3.8	∞	Off
155	K ₁₃ +H _{1.5.2} +S ₄ /Same as 154 except strakes on aft crown	"	"	"	"	"	"	"
156	K ₁₃ +H _{1.0} /Baseline with K ₁₃ , i.e., stiff pitch arms	"	"	"	"	"	"	"
158	K ₁₃ -M+H _{1.0} /Wake studies with blades off, hub not rotating	"	0/0	"	"	"	"	"
159	K ₁₃ -M-H _{1.0} /Wake studies with hub off	"	"	"	"	"	"	"
160	K ₁₃ -M+H _{1.0} /Same as 158 except hub is rotating	"	1433/0	"	"	"	"	"
161	K ₁₃ -M+H _{1.5.2} /Repeat of 154 without blades	"	0/0	"	"	"	"	"
162	K ₁₃ -M+H _{1.5.3} /Same as 161 except 4" gap	"	"	"	"	"	"	"
163	K ₁₃ -M+H _{1.5.4} /Same as 161 except 2" gap	"	"	"	"	"	"	"
164	K ₁₃ -M+H _{1.5.1} /Same as 161 except 0.5" gap	"	"	"	"	"	"	"
165	K ₁₃ -M+H _{1.0.1} /10" open hub cap, no underbody, same cap vert. position as Run 154	"	"	"	"	"	"	"
166	K ₁₃ -M+H _{1.0.2} /Same as 165 with cap lowered by 0.5"	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
 EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. p _{sf}	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
167	K ₁₃ -M+H _{1.7.1} /16" open cap, no underbody, 2" gap	80	0/0	8	6	-3.8	∞	Off
168	K ₁₃ +H _{1.7.1} /Blades on, same cap config. as 167	"	1433/0	"	"	"	"	"
169	K ₁₃ +H _{1.7.2} /16" open cap, no underbody, 4" gap	"	"	"	"	"	"	"
170	K ₁₃ +H _{1.0} +D _{4.0} /Extended flat top fairing on aft crown	"	"	"	"	"	"	"
171	K ₁₃ +H _{1.7.2} +D _{4.0} /Same fairing as 170, same cap as 169	"	"	"	"	"	"	"
172	K ₁₃ +H _{1.0} +E _{1.0} (0psi)/Basic air ejector zero blowing baseline	"	"	"	"	"	"	"
173	K ₁₃ +H _{1.0} +E _{1.0} (40 psi)/Same as 172 with 40 psi supply	"	"	"	"	"	"	"
174	K ₁₃ +H _{1.0} +E _{1.0} (150 psi)/Same as 172 with 150 psi supply	"	"	"	"	"	"	"
175	K ₁₃ +H _{1.0} +E _{2.5.1} (40 psi)/Ejector with wide chord shroud at 40 psi	"	"	"	"	"	"	"
176	K ₁₃ +H _{1.0} +E _{2.5.1} (150 psi)/Same as 174 with 150 psi supply	"	"	"	"	"	"	"
177	K ₁₃ +H _{1.5.4} +E _{2.5.1} (150 psi)/Same as 176 with 10" cap like 163	"	"	"	"	"	"	"
178	K ₁₃ +H _{1.0} +W _{1.0} +E _{1.1} (0 psi)/Nacelle mounted wing	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)

LIST OF TEST RUNS

EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
179	K13+H1.0+W2.0+E1.0 (0 psi)/Double slotted flapped wing	80	1433/0	8	6	-3.8	∞	Off
180	K13+H1.0+W3.0+E1.0 (0 psi)/Single slotted flapped wing	"	"	"	"	"	"	"
181	K13+H1.0+E1.2 (0 psi)/Baseline with ejector tube moved aft	"	"	"	"	"	"	"
182	K13+H1.9.0+E1.2 (0 psi)/Standard 10" frisbee	"	"	"	"	"	"	"
183	K13+H1.9.1+E1.2 (0 psi)/16" fabricated frisbee	"	"	"	"	"	"	"
184	K13+H1.0+E3.5.2 (40 psi)/Wide chord with lip at 40 psi	"	"	"	"	"	"	"
185	K13+H1.0+E3.5.2 (150 psi)/Same as 184 with 150 psi air	"	"	"	"	"	"	"
186	K13+H1.0+W4.0/Boom mounted stub wing	"	"	"	"	"	"	"
187	K13+H1.0+E3.5.4 (150 psi)/Like 185 with modified shroud	"	"	"	"	"	"	"
188	K13+H1.0+I1+E1.0 (0 psi)/Baseline with I1 instr. ring	"	"	"	"	"	"	"
189	K13+H1.8.1+I1+E1.0 (0 psi)/Solid cap, 10" diam. 3.25" height	"	"	"	"	"	"	"
190	K13+H1.8.2+I1+E1.0 (0 psi)/Same as 190 except + 4.12" height	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS

EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG, psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
191	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.87" gap	80	1433/0	8	6	-3.8	∞	Off
193	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.25" gap	"	"	"	"	"	"	"
194	K13+H1.11.1+I2+E1.0 (0 psi)/7.6" cap, underbody, 1.25" gap	"	"	"	"	"	"	"
195	K13+H1.11.1+I2+E1.0 (20 psi)/Same as 194 with 20 psi air	"	"	"	"	"	"	"
196	K13+H1.11.1+I2+E1.0 (40 psi)/Same as 194 with 40 psi air	"	"	"	"	"	"	"
197	K13+H1.11.1+I2+E1.0 (150 psi)/Same as 194 with 150 psi air	"	"	"	"	"	"	"
198	K13+H1.11.1+I2+E4.0 (0 psi)/Same as 194 except blowing tube 2" aft	"	"	"	"	"	"	"
199	K13+H1.11.1+I2+E4.0 (40 psi)/Same as 198 with 40 psi air	"	"	"	"	"	"	"
200	K13+H1.11.1+I2+E4.0 (150 psi)/Same as 198 with 150 psi air	"	"	"	"	"	"	"
201	K13+H1.11.2+I2+E4.0 (150 psi)/Same as 200 except center support cap	"	"	"	"	"	"	"
202	K13+H1.11.2+I2/Baseline with I2 and no blowing tube	"	"	"	"	"	"	"
203	K13+H1.0+E5.0 (0 psi)/Bifurcated air duct baseline	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)

LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
204	K13+H1.0+E5.0 (150 psi)/Bifurcated duct with 150 psi air	80	1433/0	8	6	-3.8	∞	Off
205	K13+H1.0+E5.0 (40 psi)/Same as 204 with 40 psi air	"	"	"	"	"	"	"
207	K13+H1.2.1+I1+E1.0 (0 psi)/7.6" solid cap, no gap	"	"	"	"	"	"	"
208	K13+H1.2.2+I1+E1.0 (0 psi)/Same as 207 except 0.55" gap	"	"	"	"	"	"	"
210	K13+H1.15.1+I1+E1.0 (0 psi)/Repeat of 189	"	"	"	"	"	"	"
211	K13+H1.14.1+I1+E1.0 (0 psi)/Like 189 and 210 except cap is oper	"	"	"	"	"	"	"

TABLE 3

INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
111	20	53.5	103.1	-7.25	1
	21	"	"	"	
	22	"	105.0	"	
	24	"	107.0	"	
	26	"	109.0	"	
	28	"	111.0	"	
	30	"	112.9	"	
	32	"	114.9	"	
	34	"	116.9	"	
	36	"	118.9	"	
112	2	48.9	107.3	-7.25	1
	4	50.8	"	"	
	6	52.7	103.3	"	
	8	54.5	"	"	
	10	56.2	"	"	
	12	57.2	"	"	
113	2	51.7	103.3	-3.25	1
	4	52.3	"	"	
	6	52.8	"	"	
	8	53.3	"	"	
	10	53.9	"	"	
	11	53.3	"	"	
114	2	44.5	103.0	-3.25	1
	4	46.4	"	"	
	6	48.2	"	"	
	8	50.0	"	"	
	10	51.9	"	"	
115	3	52.9	124.7	-3.25	1
	4	52.0	"	"	
	6	50.0	"	"	
	9	48.0	"	"	
	10	46.0	"	"	
	12	44.1	"	"	
	14	42.1	"	"	
	16	53.0	"	"	
	18	54.0	"	"	
	20	55.0	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
116	7	36.9	100.5	-17.5	1
117	2	37.6	100.5	-16.0	1
	4	"	"	-14.0	
	6	37.3	99.6	-12.0	
	8	"	"	-10.0	
	10	"	"	- 8.0	
118	2	37.6	100.5	- 6.0	1
119	2	37.3	99.6	+ 6.0	1
	5	"	"	8	
	8	"	"	10	
	9	"	"	"	
	14	"	"	14	
	16	"	"	16	
	20	51.5	102.5	17.5	
	25	52.3	101.7	-17.5	
121	3	62.9	129.0	+ 5.7	2
	4	53.5	"	"	
	6	50.1	"	"	
	8	46.0	"	"	
	10	42.1	"	"	
135	2	56.9	106.3	- 5.7	3
	4	54.5	"	"	
	6	52.5	"	"	
	8	50.5	"	"	
	10	48.5	"	"	
	14	44.5	"	"	
136	2	56.5	104.0	- 8.0	4
	4	54.5	"	"	
	6	52.5	"	"	
	8	50.6	"	"	
	10	48.5	"	"	
	12	46.5	"	"	
	14	44.5	"	"	
	17	37.1	"	"	
	18	39.0	"	"	
	19	41.0	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
137	3	38.7	98.4	- 8.0	5
	5	39.9	"	"	
	7	42.0	100.5	"	
	9	44.0	"	"	
	11	46.0	103.6	"	
	13	48.0	"	"	
	15	50.0	"	"	
	17	52.0	"	"	
	19	54.0	"	"	
138-41, 143	2	38.8	98.4	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.5	"	
	5	44.0	"	"	
	6	46.0	103.6	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
	142	7	37.8	98.4	
8		"	"	"	
9		40.2	"	"	
10		42.0	100.5	"	
11		44.0	"	"	
12		46.0	103.6	"	
13		48.0	"	"	
14		50.0	"	"	
15		52.0	"	"	
	16	54.0	"	"	
	17	56.8	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
149-151	2 3 4 5 6 7 8 9 10	38.8 40.0 42.0 44.0 46.0 48.0 50.0 52.0 54.0	98.5 " 100.6 " 103.5 " " " "	- 8.0 " " " " " " " "	5
152-6, 158 161-4, 166 167, 169-71 175, 177-9 180, 182, 184 186-8, 190 191, 193, 194 196, 198, 201 204, 207, 208 211	2 3 4 5 6 7 8 9	42.9 44.9 46.9 48.9 50.9 52.9 54.9 56.9	97.9 " 100.6 " 104.6 " " " "	0.0 " " " " " " "	6
159	1 2 3 4 5	54.9 52.9 50.7 48.6 46.7	104.6 " " 100.6 "	0.0 " " " "	6
160, 203	5 6 7 8 9 10 11	42.9 44.9 46.9 48.9 50.9 52.9 54.9	97.9 " 100.6 " 104.6 " "	0.0 " " " " " "	6
165	3 4 5 6 7 8	44.9 42.9 46.9 48.9 50.9 52.9	97.9 " 100.6 " 104.6 "	0.0 " " " " "	6

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE		
168, 183	4	42.9	97.9	0.0	6		
	5	44.9	"	"			
	6	46.9	100.6	"			
	7	48.9	"	"			
	8	50.9	104.6	"			
	9	52.9	"	"			
	10	54.9	"	"			
172	3	42.9	97.9	0.0	6		
	4	44.9	"	"			
	6	44.9	"	"			
	7	46.9	100.6	"			
	8	48.9	"	"			
	9	50.9	104.6	"			
	10	52.9	"	"			
	11	54.9	"	"			
173,174,176 185,195,197 199,200,205 210	1	42.9	97.9	0.0	6		
	2	44.9	"	"			
	3	46.9	100.6	"			
	4	48.9	"	"			
	5	50.9	104.6	"			
	6	52.9	"	"			
	7	54.9	"	"			
181	2	42.9	97.9	0.0	6		
	3	44.9	"	"			
	4	46.9	100.6	"			
	5	48.9	"	"			
	6	50.9	104.6	"			
	7	52.9	"	"			
	9	54.9	"	"			
	10	"	"	"			
	11	"	"	"			
	12	"	"	"			
	13	42.9	97.9	"			

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
189	29	42.9	97.9	0.0	6
	30	44.9	"	"	
	31	46.9	100.6	"	
	32	48.9	"	"	
	33	"	"	"	
	34	50.9	104.6	"	
	35	"	"	"	
	36	48.9	100.6	"	
	37	50.9	104.6	"	
	38	52.9	"	"	
	39	54.9	"	"	
202	3	43.4	97.9	0.0	6
	4	44.9	"	"	
	5	46.9	100.6	"	
	6	48.9	"	"	
	7	50.9	104.6	"	

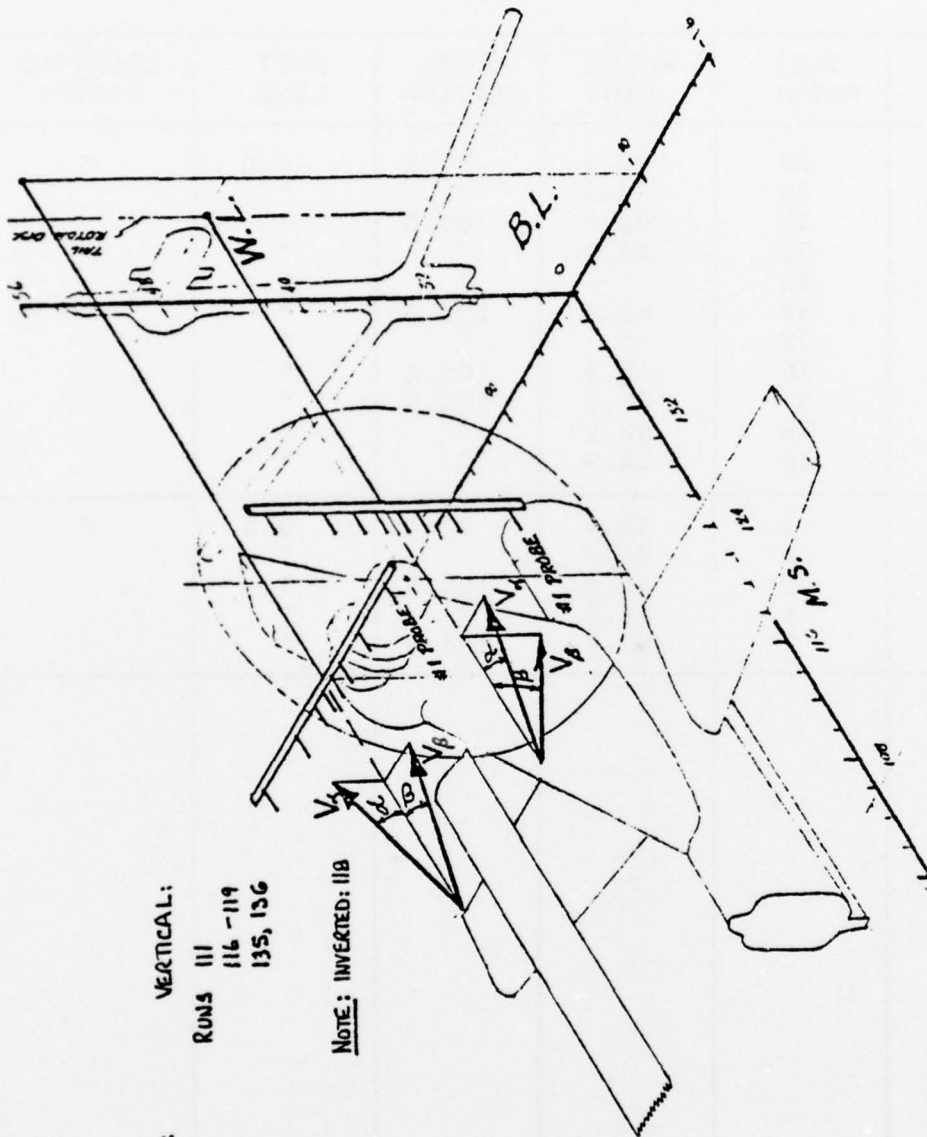


FIGURE 1 - RAKE ORIENTATION DIAGRAM

RUN 121

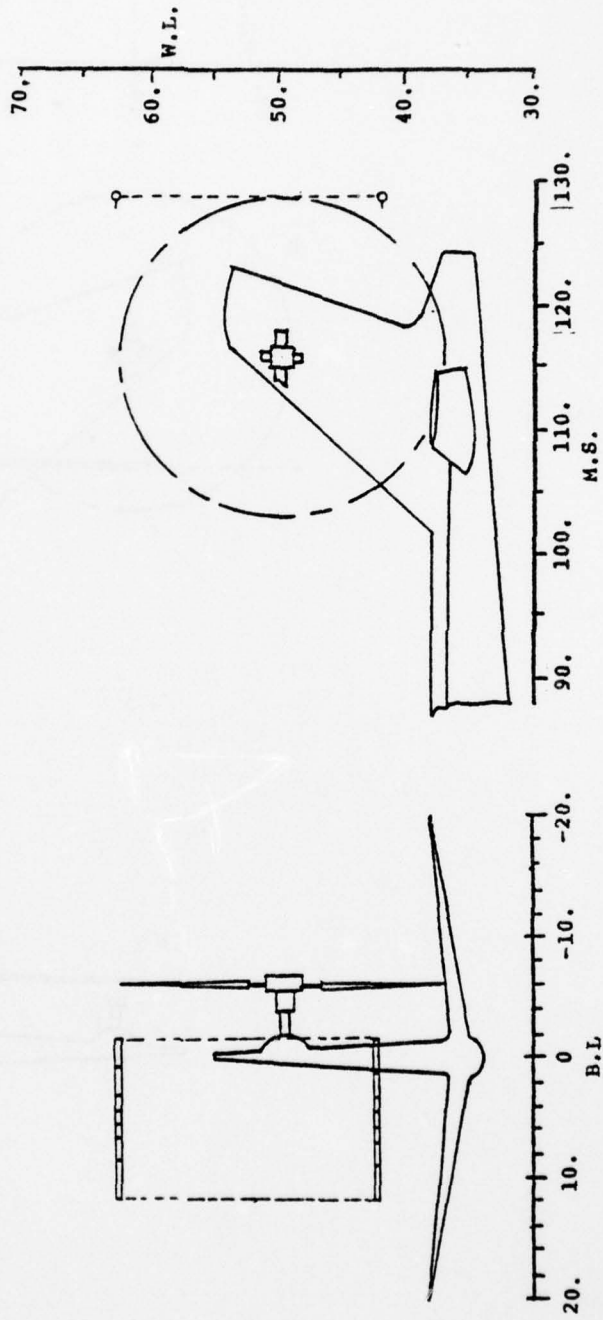


FIGURE 2 -HOT FILM RAKE LOCATIONS

RUN 135

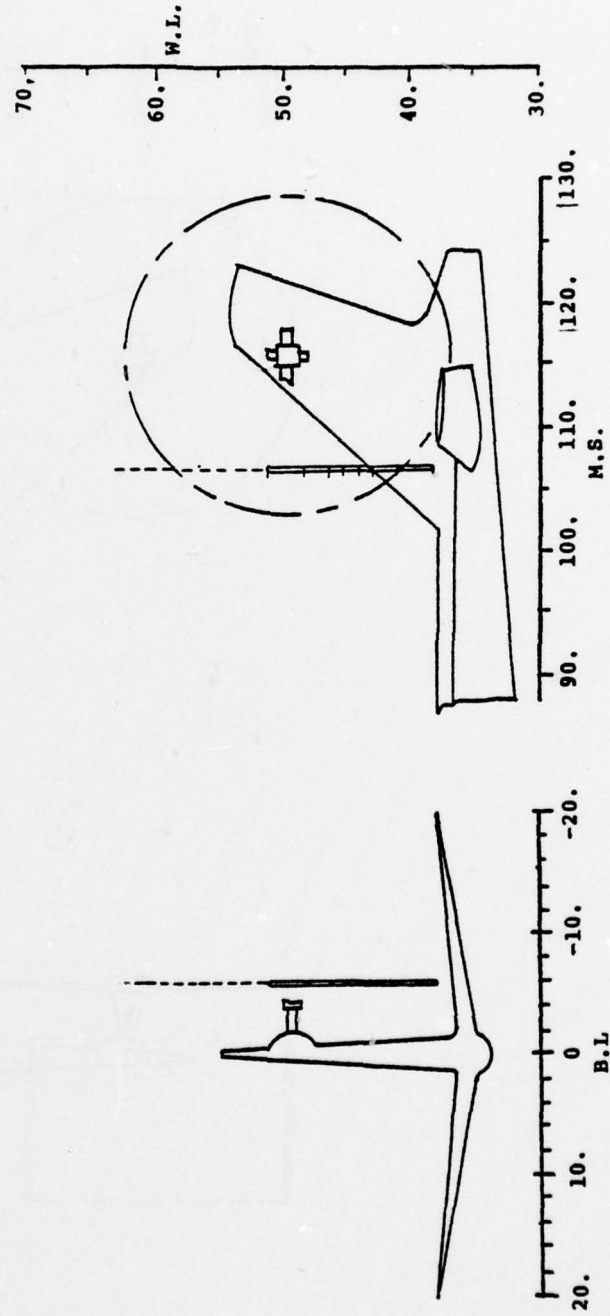


FIGURE 3 -HOT FILM RAKE LOCATIONS

RUN 136

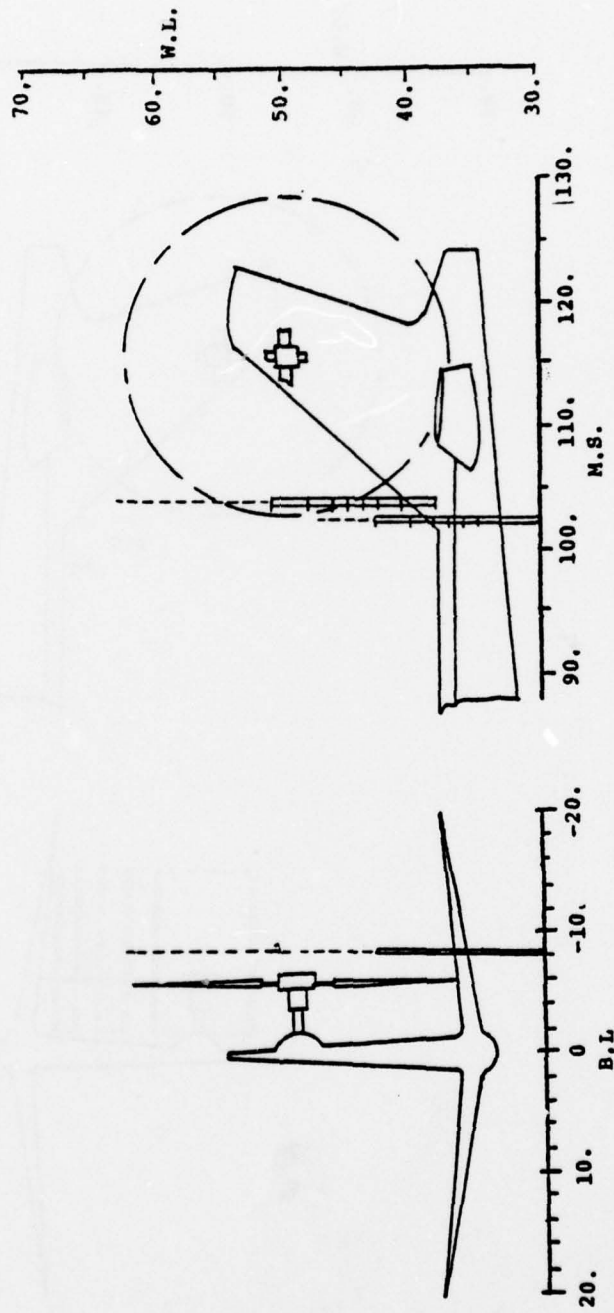


FIGURE 4 -HOT FILM RAKE LOCATIONS

RUN 137, 138, 139, 140, 141, 142,
143, 148, 149, 150, 151

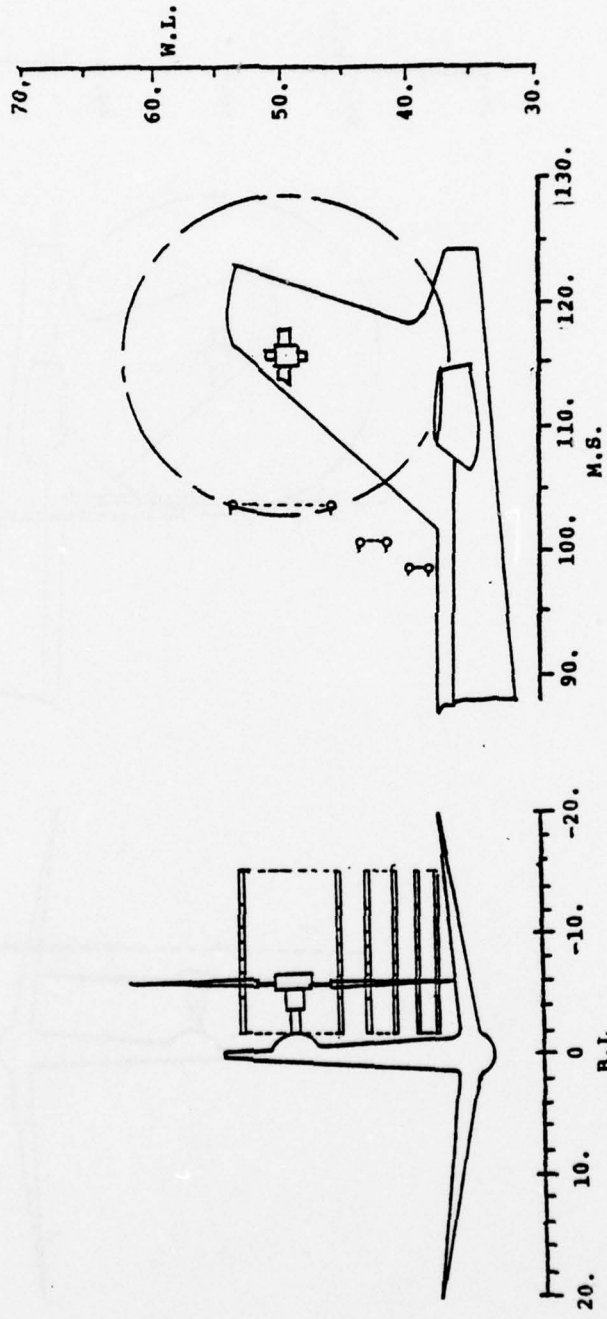


FIGURE 5 -HOT FILM RAKE LOCATIONS

RUN 152-156, 158-211

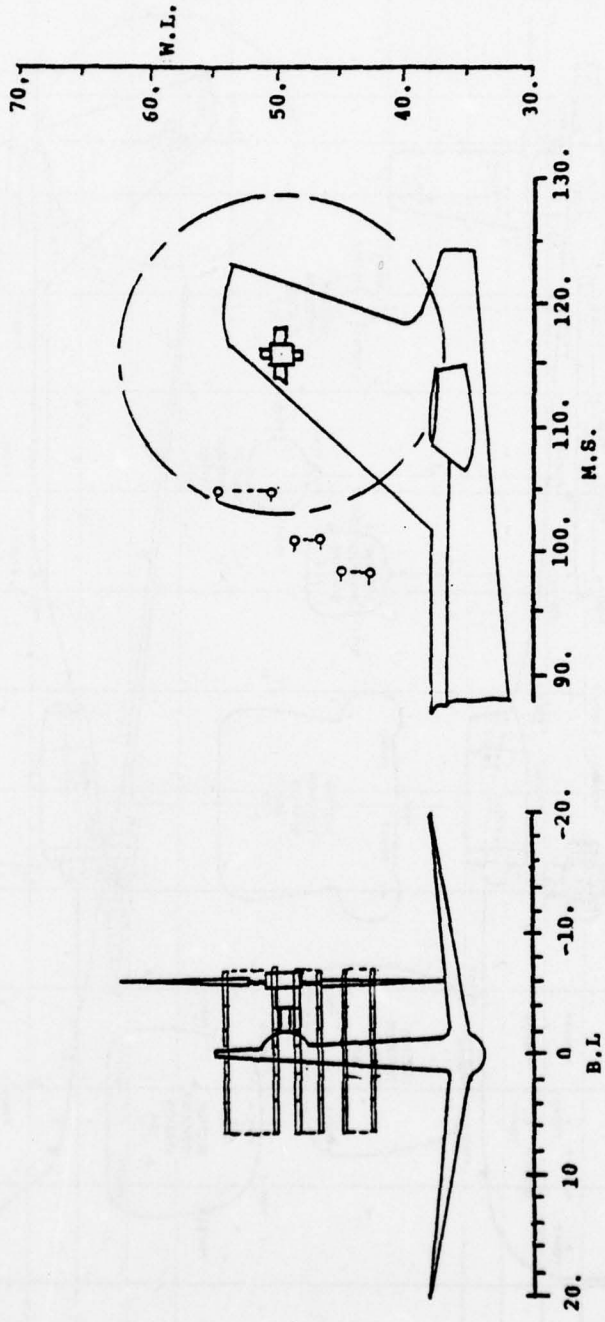


FIGURE 6 -HOT FILM RAKE LOCATIONS

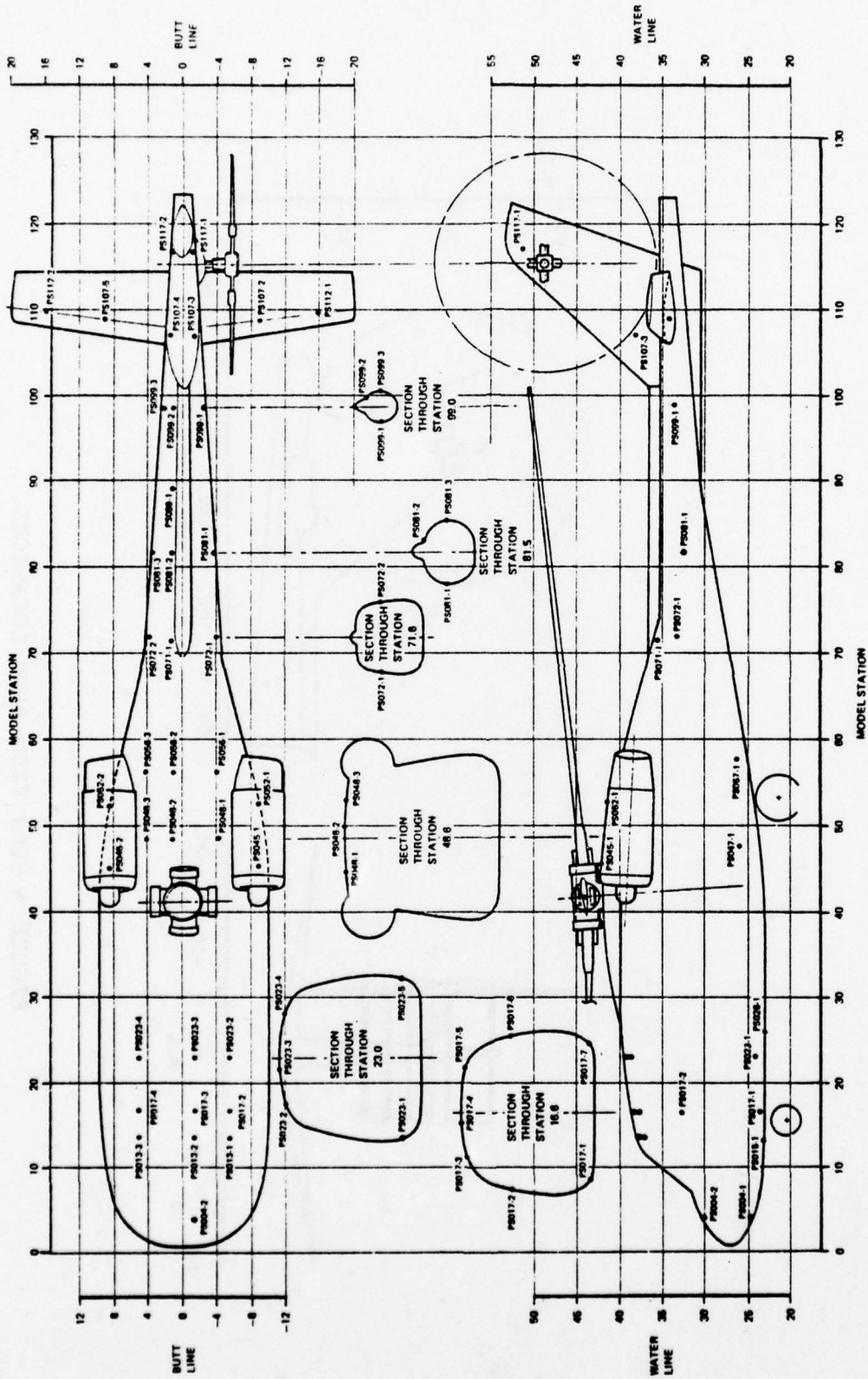
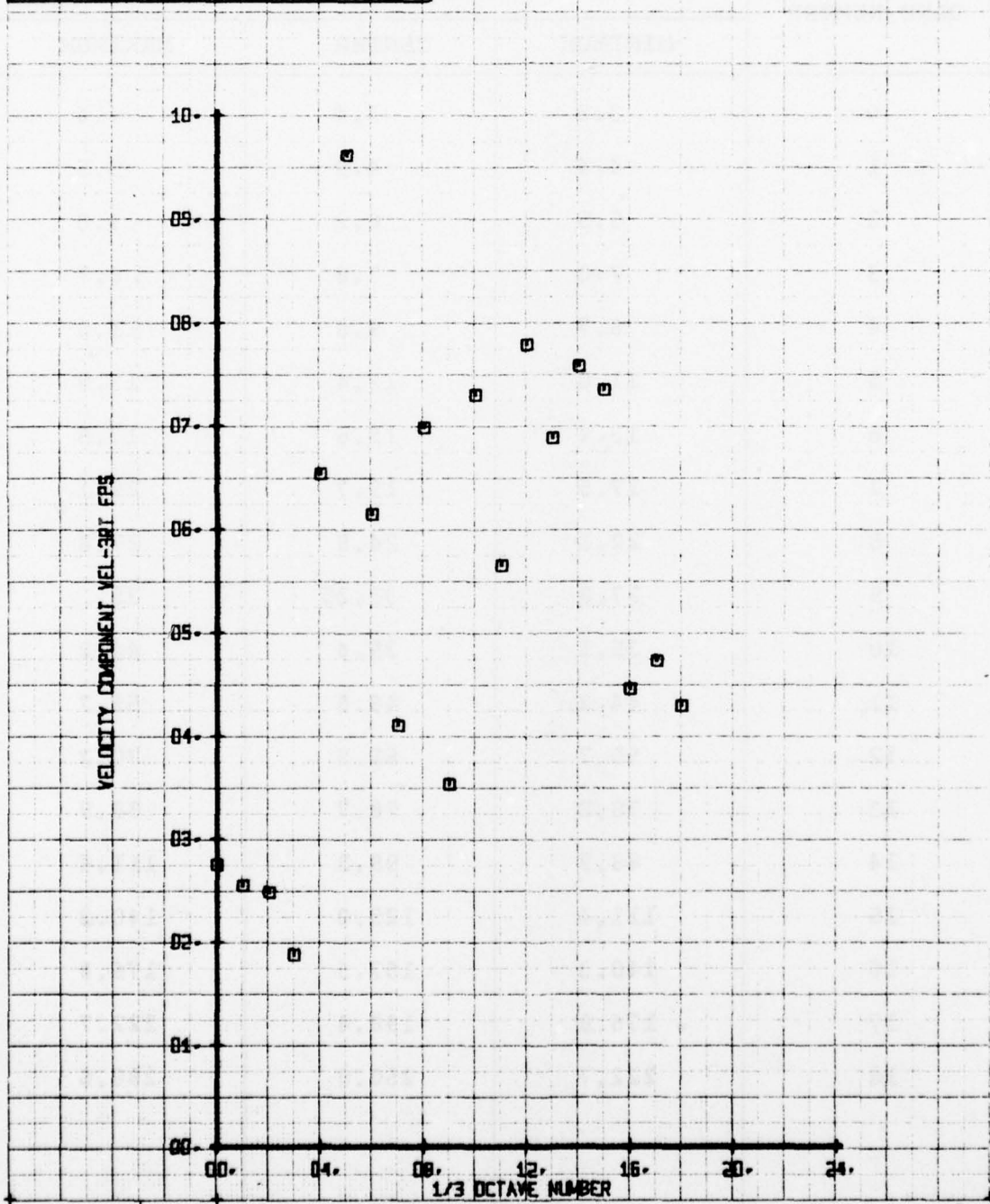


TABLE 4
1/3 OCTAVE BAND IDENTIFICATION

BAND NUMBER	BAND WIDTH - Hz		
	MINIMUM	CENTER	MAXIMUM
0	3.5	3.4	4.4
1	4.4	4.9	5.5
2	5.5	6.2	7.0
3	7.0	7.8	8.7
4	8.7	9.8	11.0
5	11.0	12.4	13.9
6	13.4	15.6	17.5
7	17.5	19.7	22.1
8	22.1	24.8	27.8
9	27.8	31.25	35.1
10	35.1	39.4	44.2
11	44.2	49.6	55.7
12	55.7	62.5	70.2
13	70.2	78.7	88.9
14	88.9	99.2	111.4
15	111.4	125.0	140.3
16	140.3	157.5	176.8
17	176.8	198.4	222.7
18	222.7	250.0	280.6

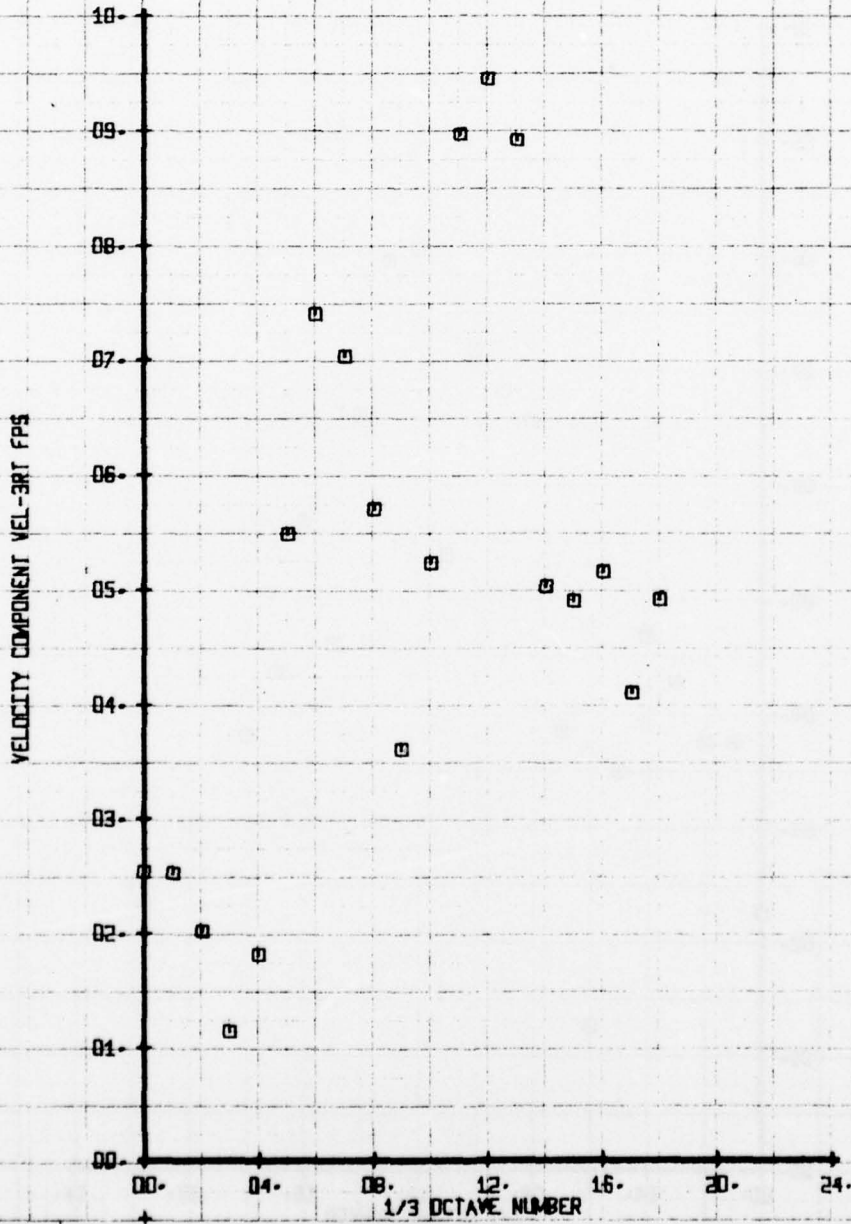
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 2

LEGEND
 SYM CH PARAMETER
 □ 71 VEL-3RT



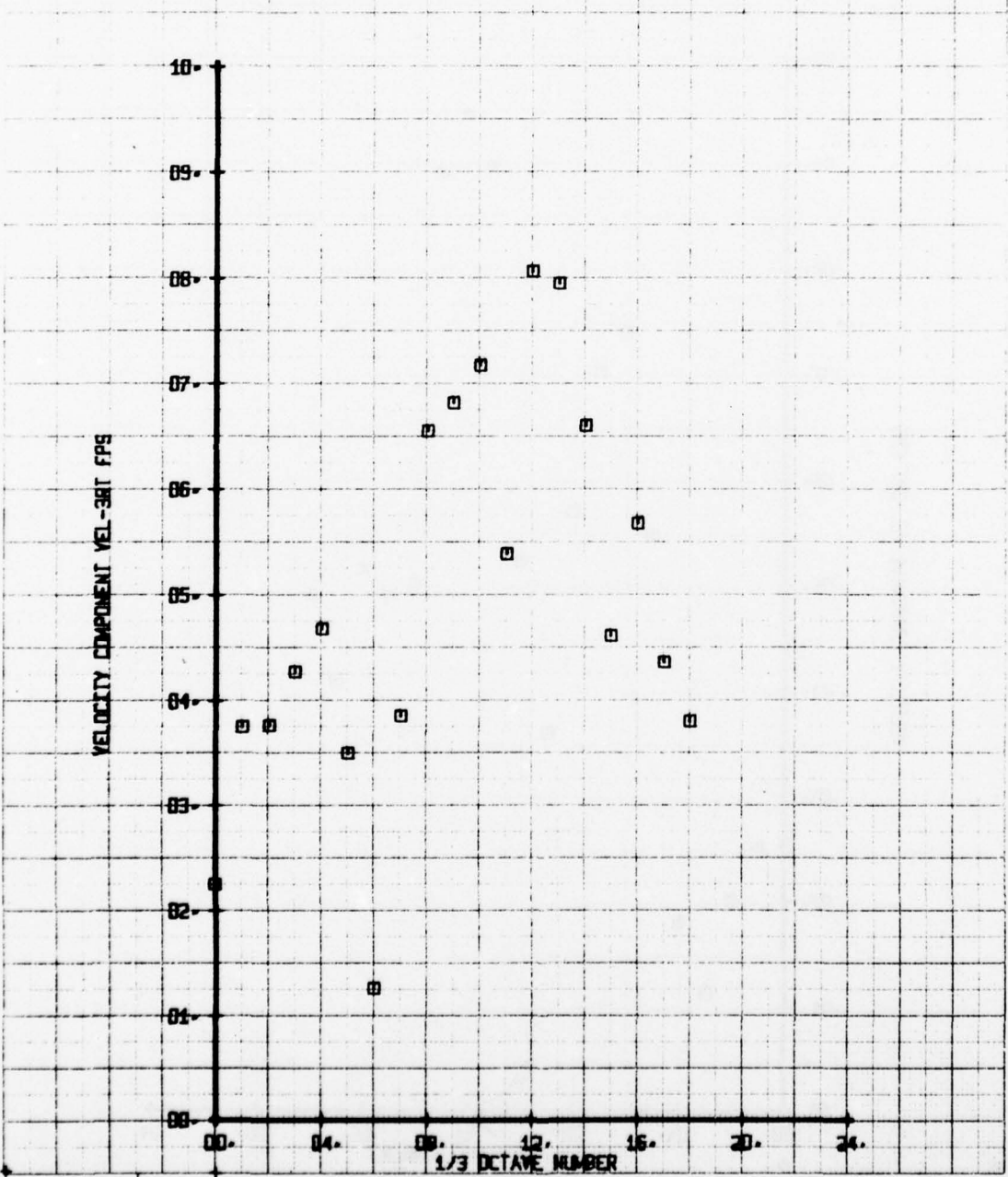
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELL'S DEF
RUN 149 TP 3

SYM	CH	LEGEND
□	71	PARAMETER VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 4

LEGEND
SYM CH PARAMETER
□ 71 VEL-3RT

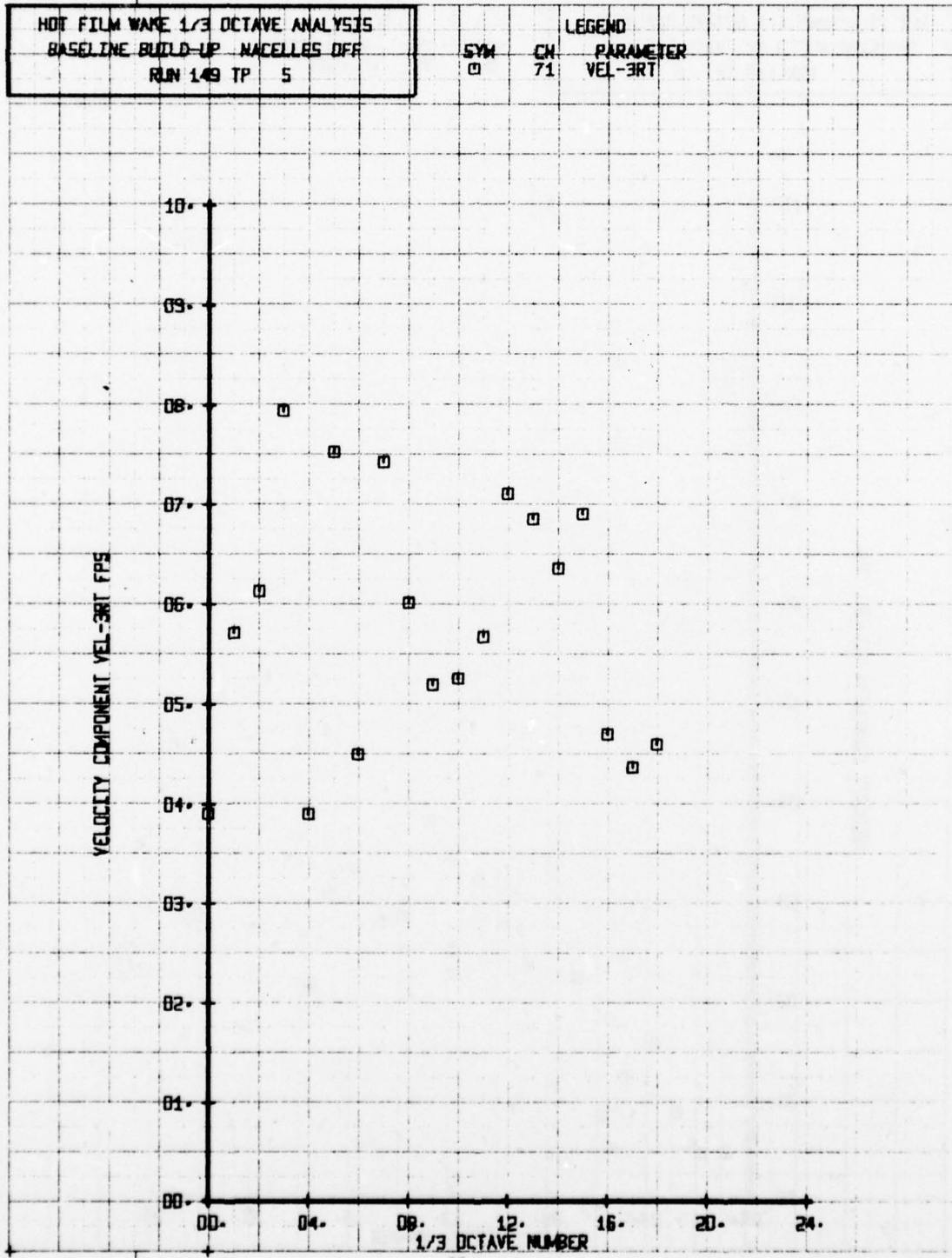


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 5

SYM
□

CH
71

LEGEND
PARAMETER
VEL-3RT



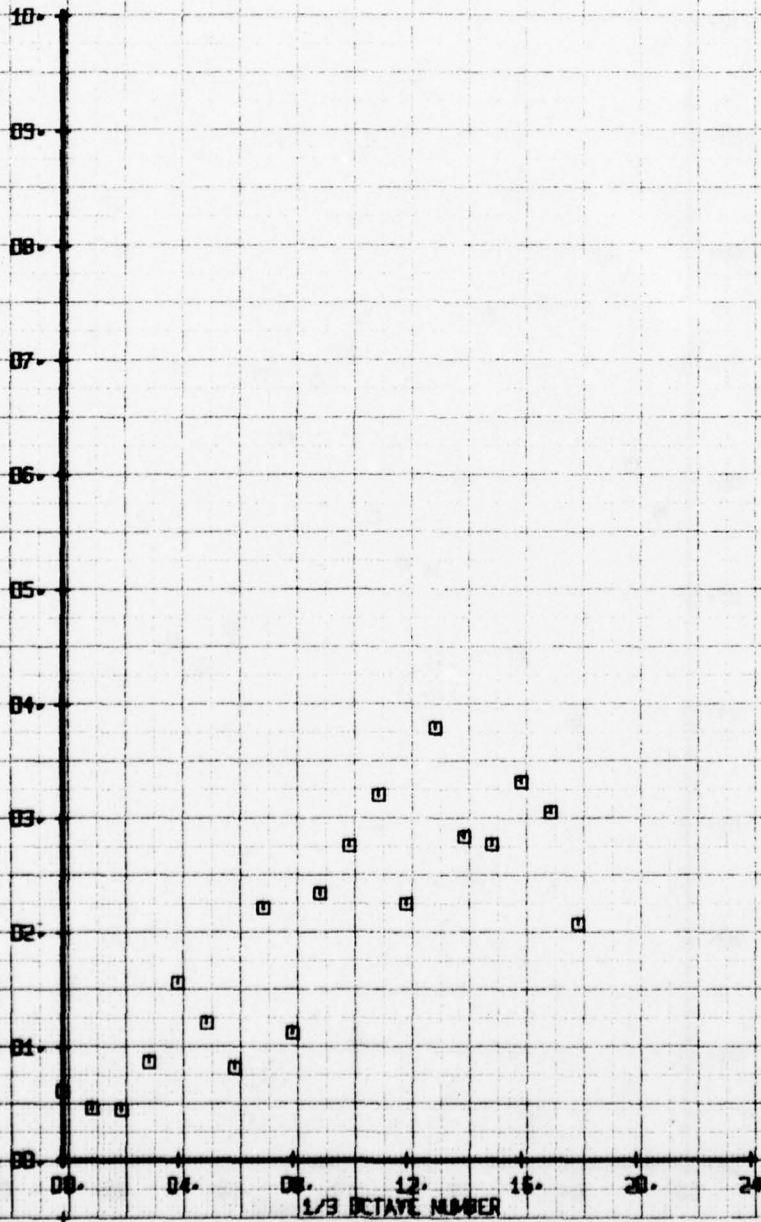
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 6

SYM
□

CH
71

LEGEND
PARAMETER
VEL-3RT

VELOCITY COMPONENT VEL-3RT FPS

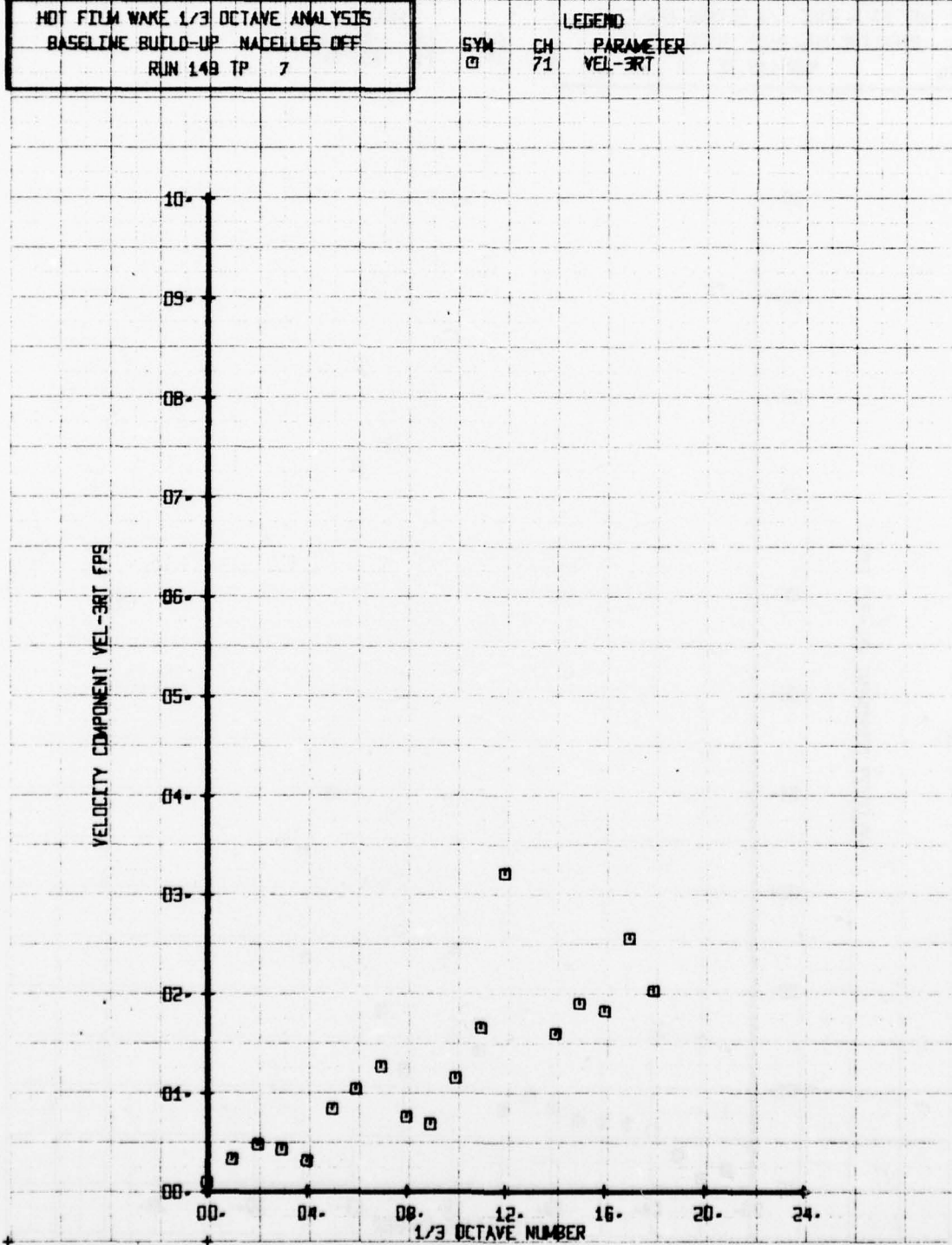


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 148 TP 7

SYM	CH	PARAMETER
□	71	VEL-3RT

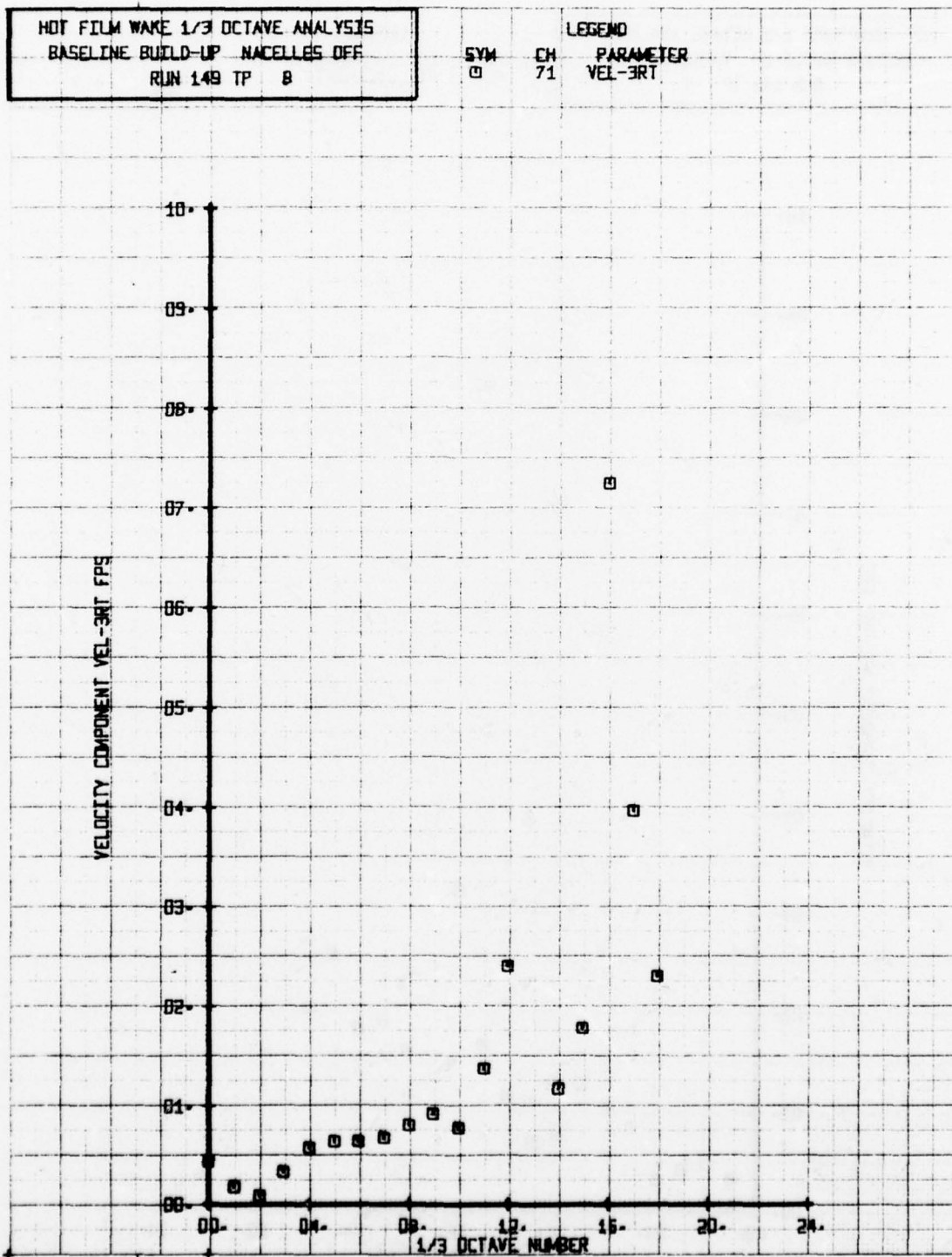
LEGEND

VELOCITY COMPONENT VEL-3RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 8

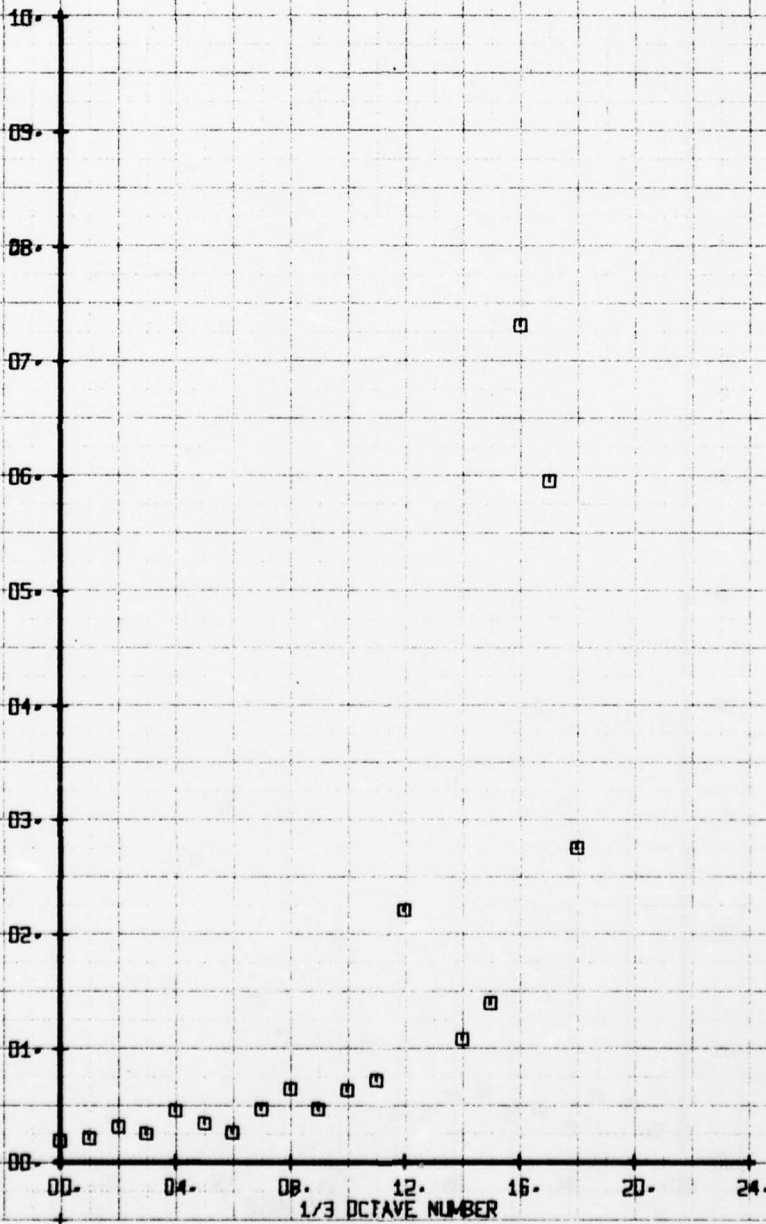
LEGEND
SYM CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 9

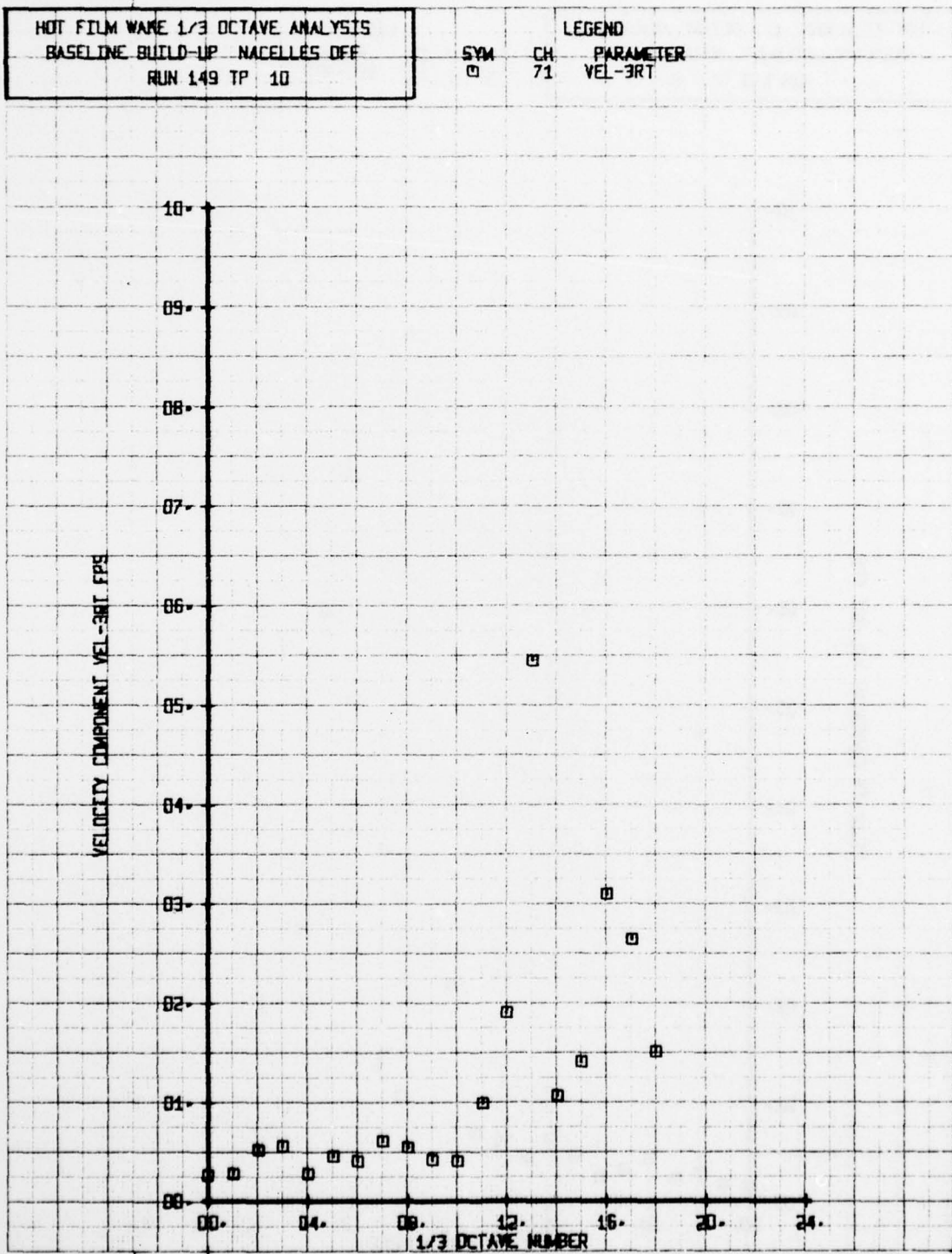
SYM	CH	PARAMETER
□	71	VEL-3RT

VELOCITY COMPONENT VEL-3RT .FPS



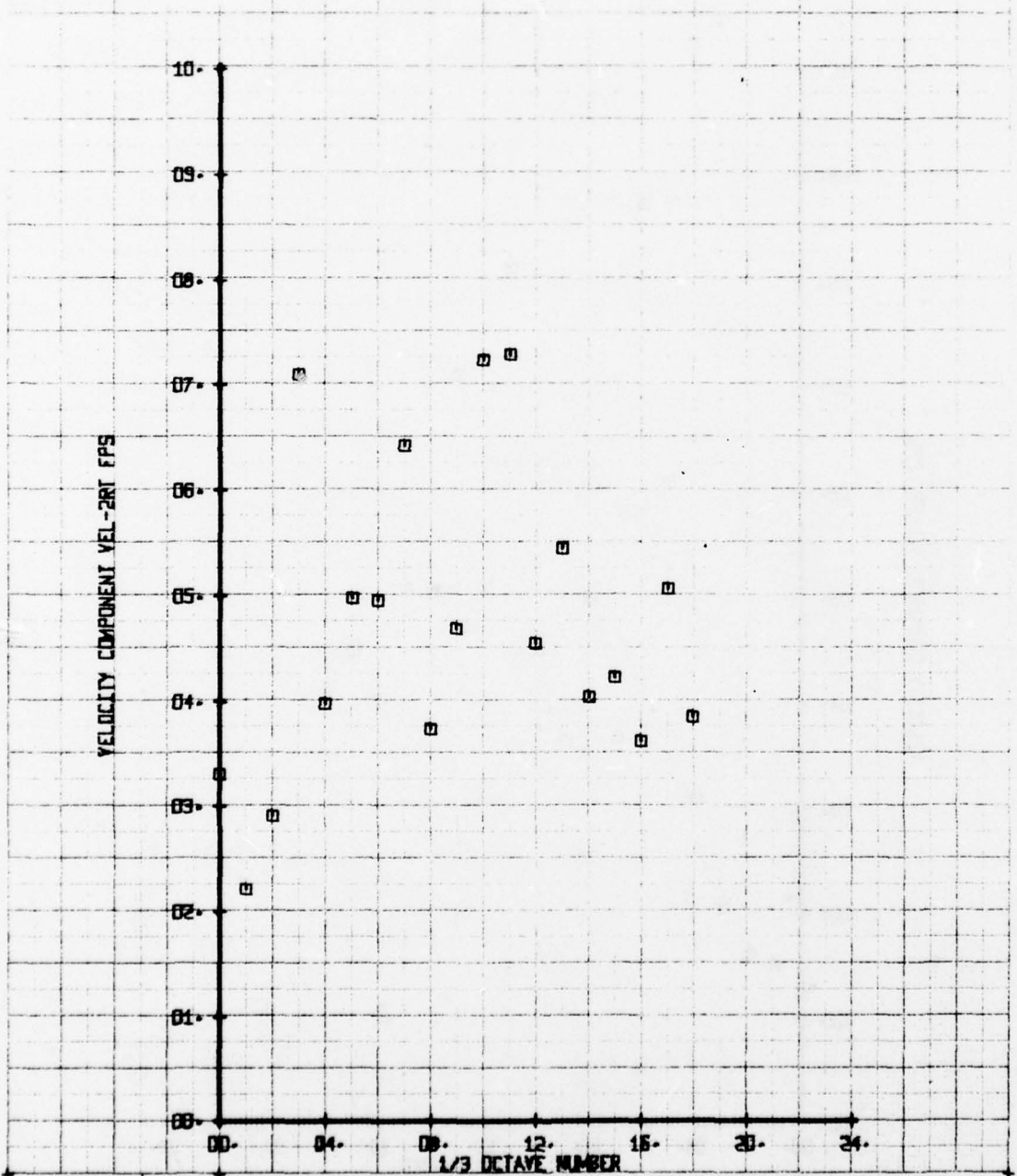
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 10

LEGEND
SYM CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 2

LEGEND
 CH PARAMETER
 75 VEL-2RT



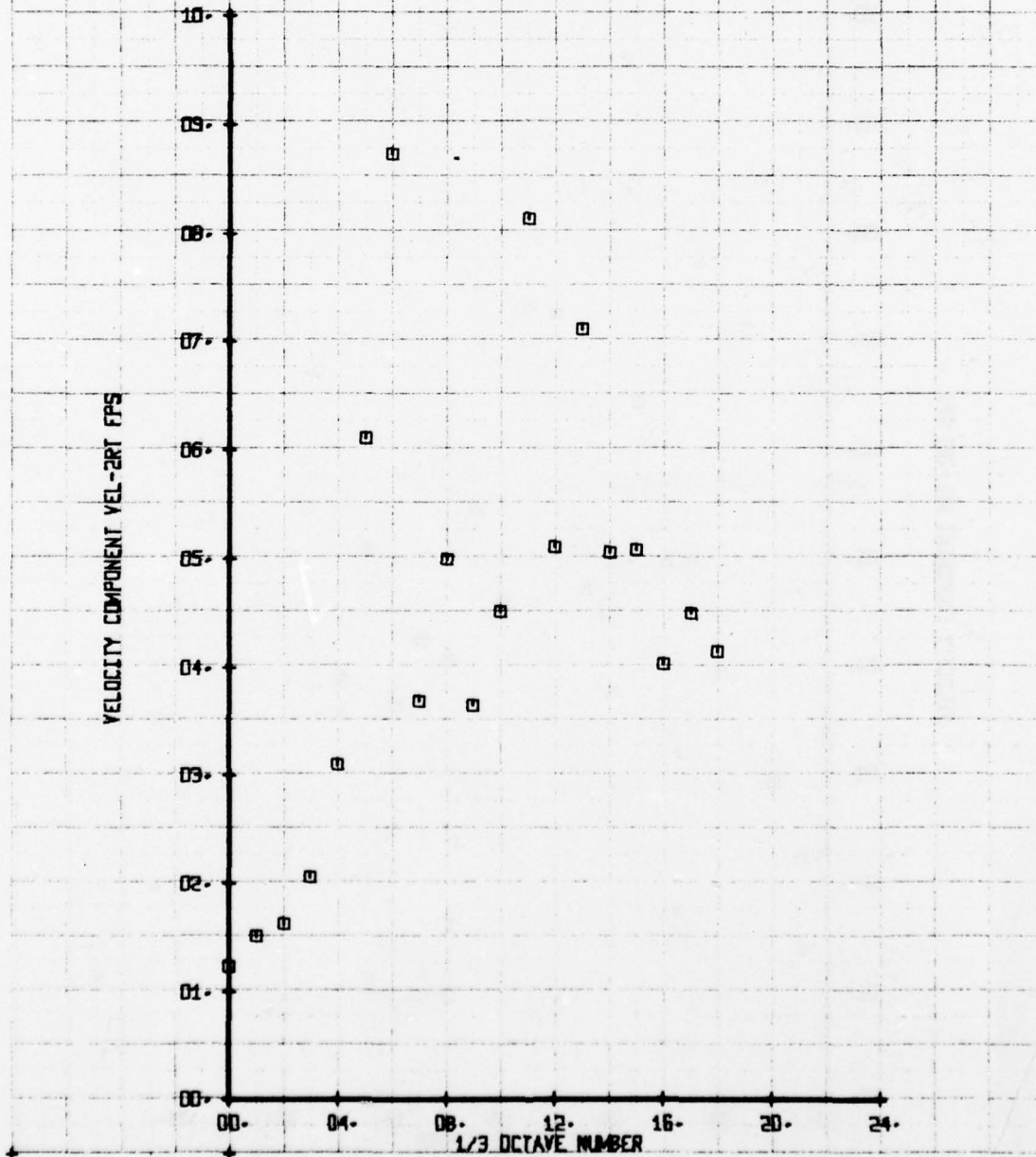
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 9

SYM
□

CH
75

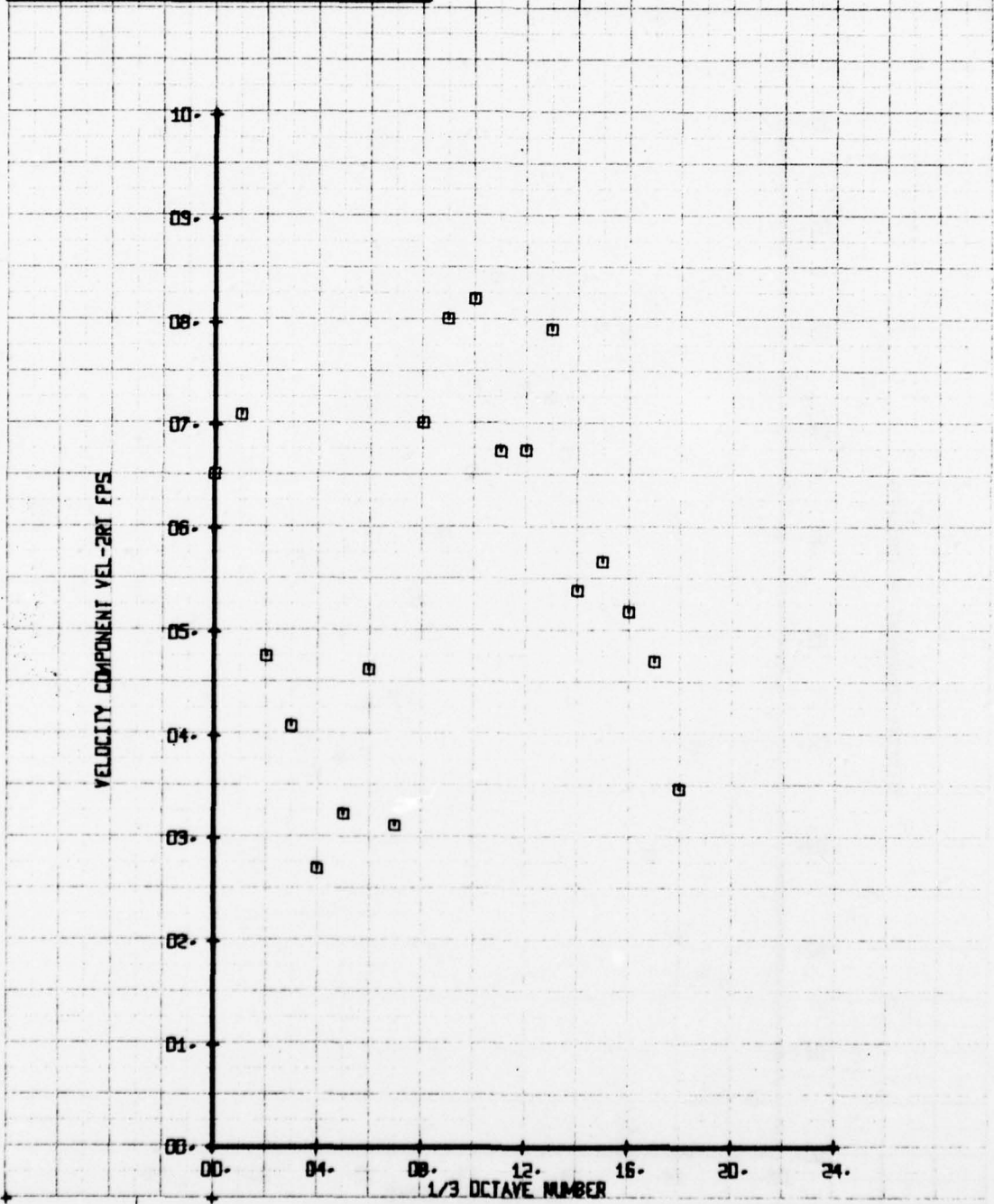
LEGEND
PARAMETER
VEL-2RT

VELOCITY COMPONENT VEL-2RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 4

SYM CH PARAMETER
 □ 75 VEL-2RT

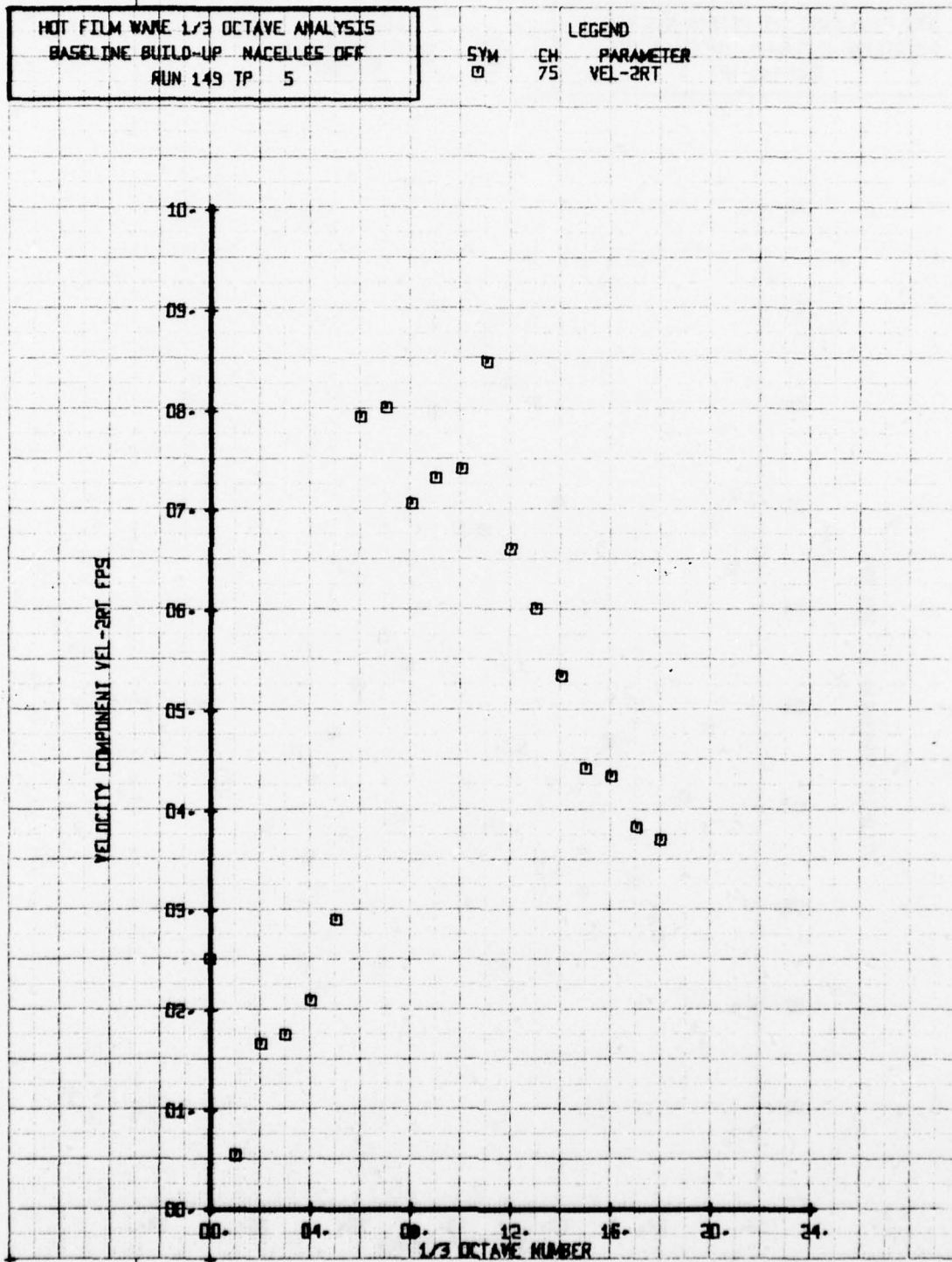


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 5

SYM
□

LEGEND

CH: 75
PARAMETER
VEL-2RT



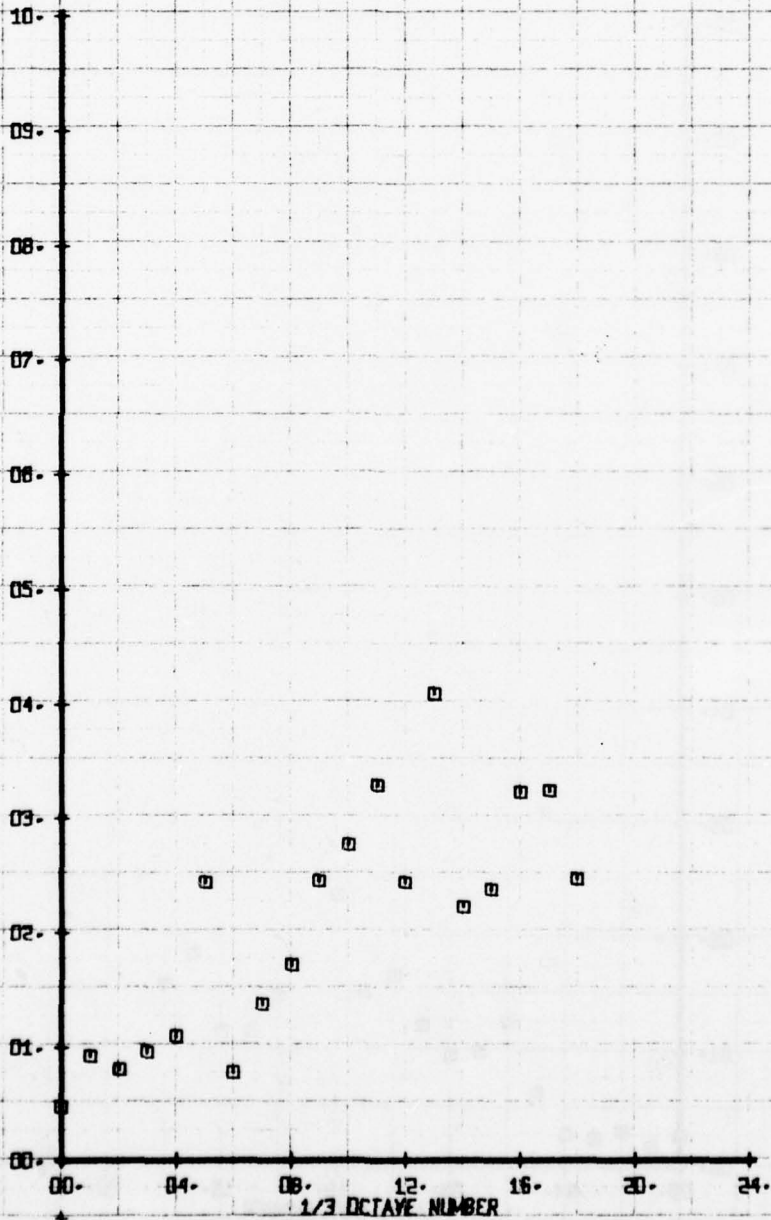
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 6

SYM
□

CH
75

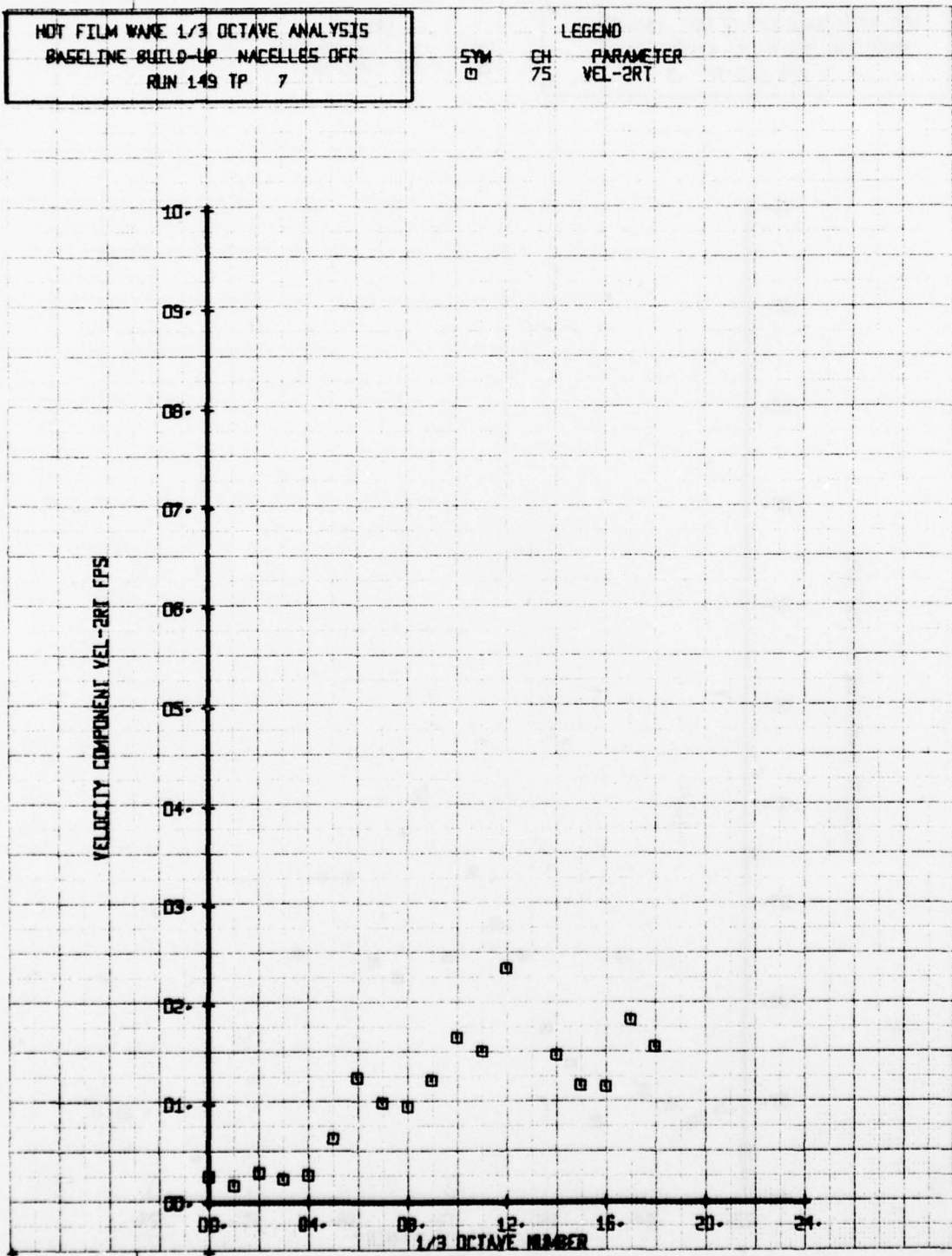
LEGEND
PARAMETER
VEL-2RT

VELOCITY COMPONENT VEL-2RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 7

LEGEND
 CH PARAMETER
 75 VEL-2RT

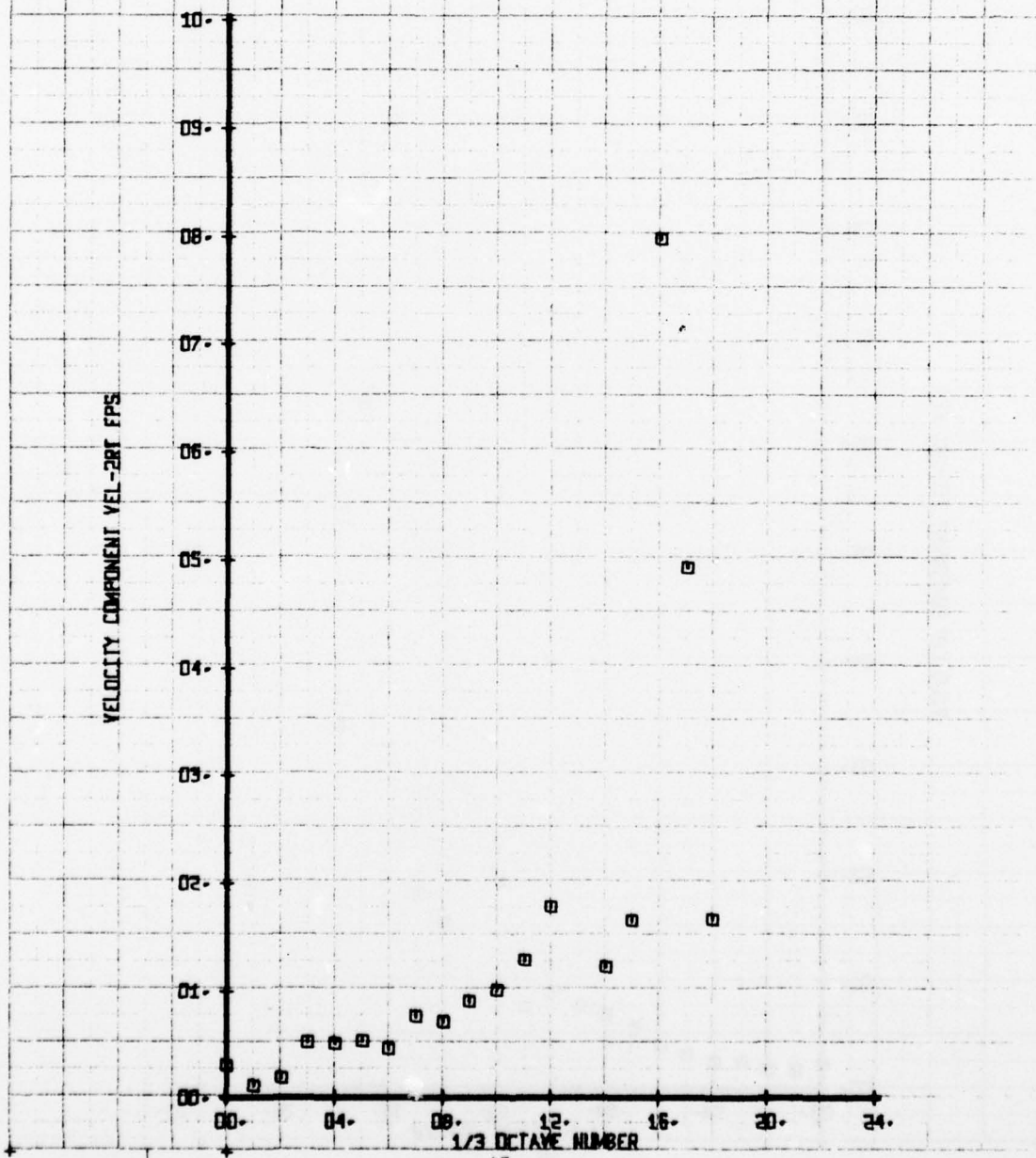


NOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP - MACELLES OFF
RUN 149 TP B

SYM
□

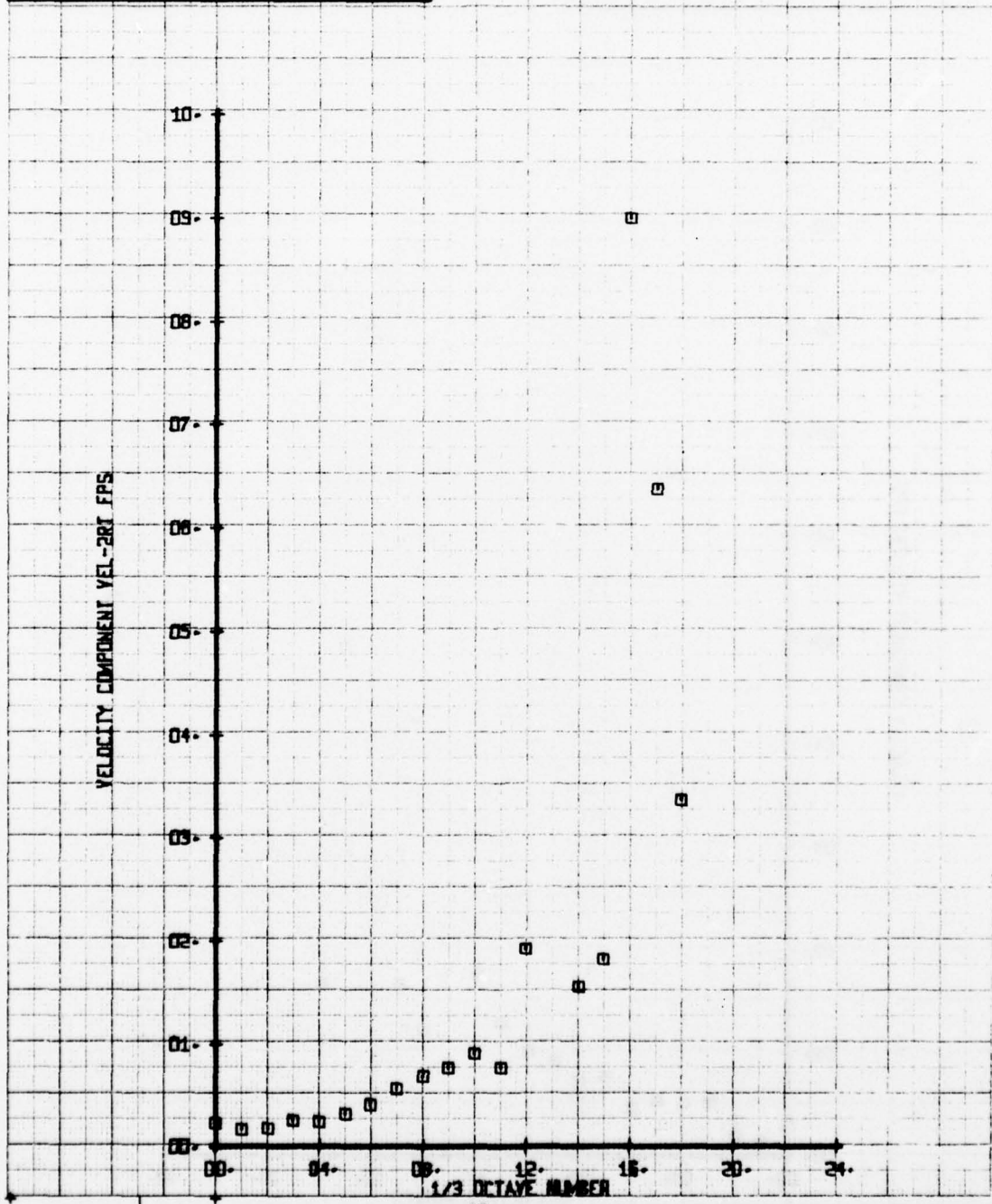
CH
75

LEGEND
PARAMETER
VEL-2RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP - NACELLES OFF
 RUN 149 TP 9

SYN CH PARAMETER
 □ 75 VEL-2RT

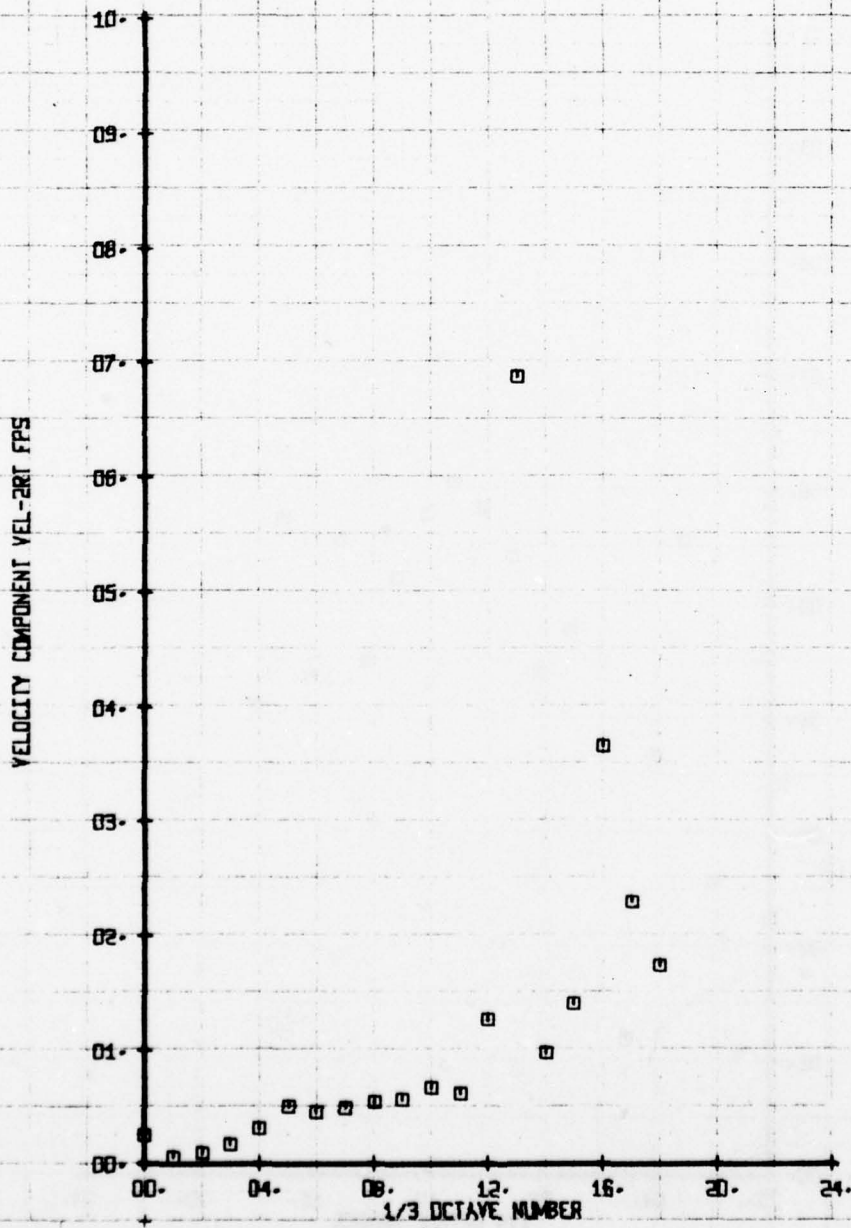


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 10

SYM
□

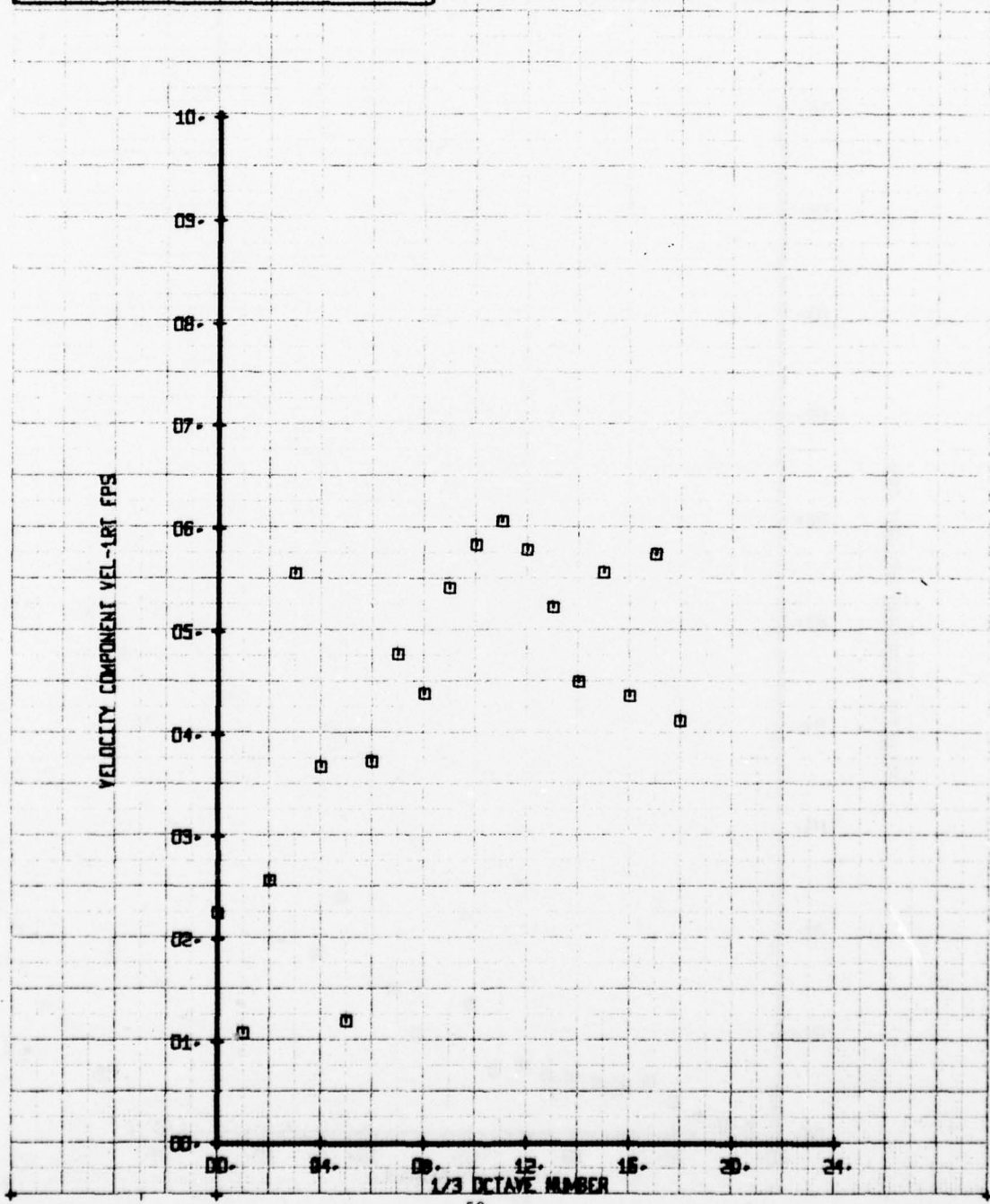
CH
751

LEGEND
PARAMETER
VEL-2RT



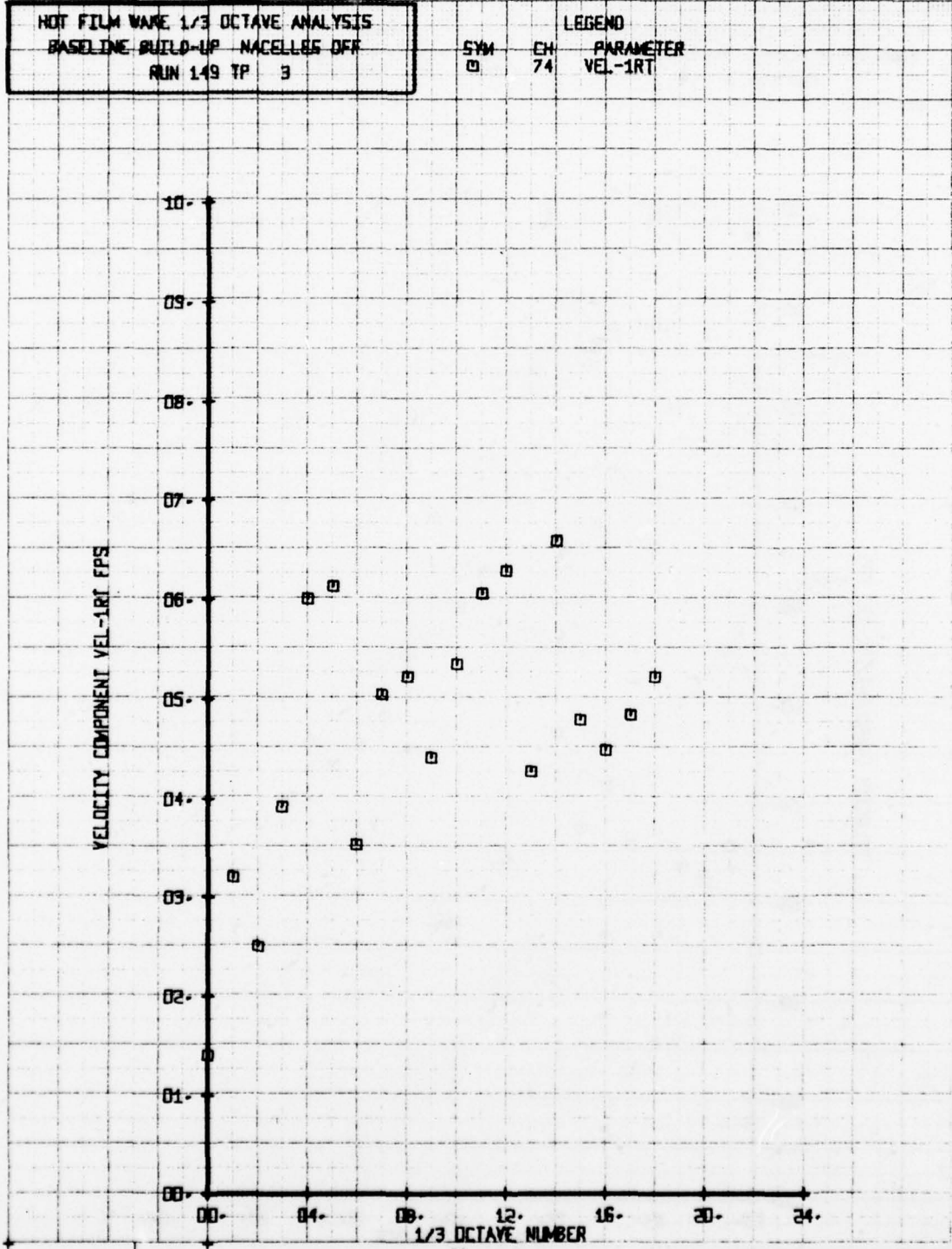
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 2

SYN CH PARAMETER
□ 74 VEL-1RT



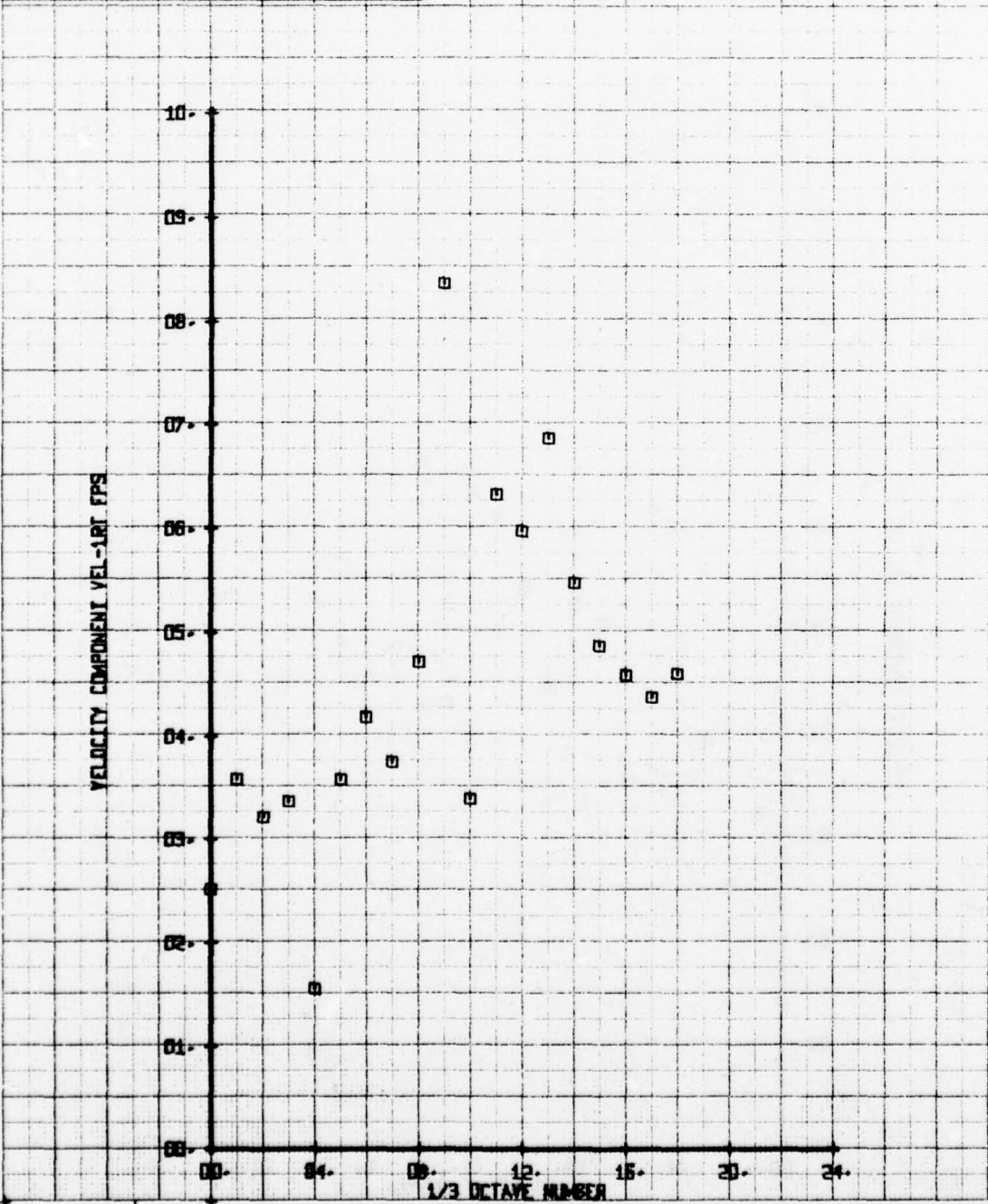
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES DFR
 RUN 149 TP 3

SYM	CH	PARAMETER
□	74	VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 4

SYM CH PARAMETER
 □ 74 VEL-1RT

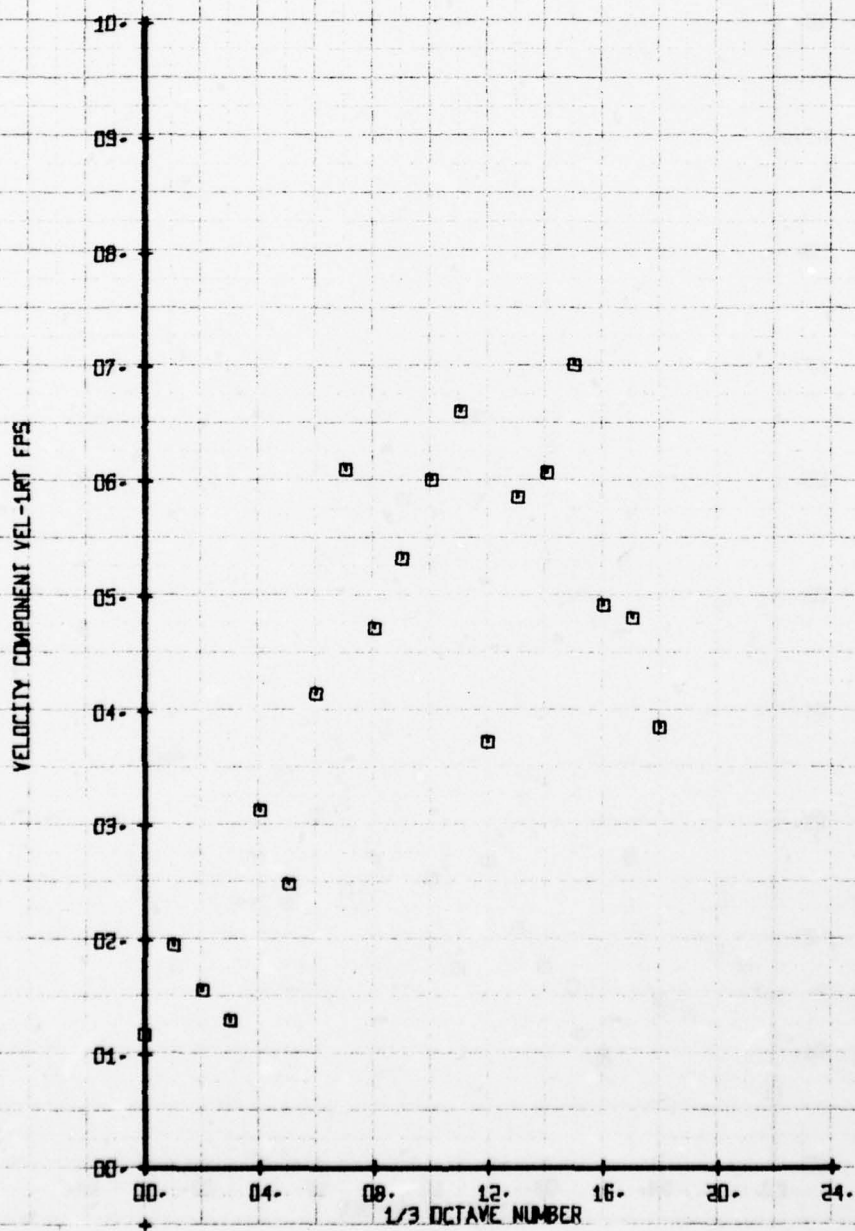


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 5

SYM
□

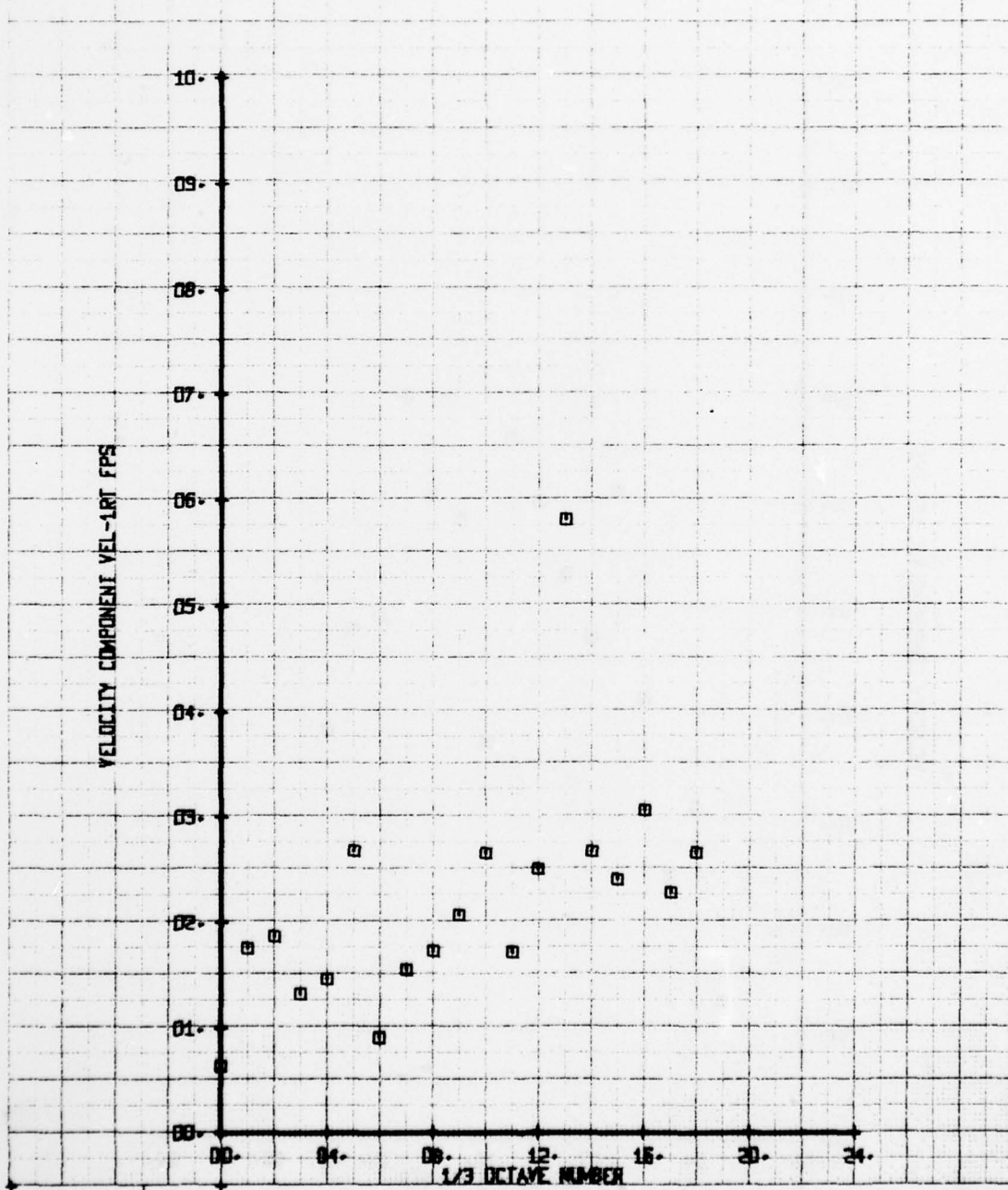
CH
74

LEGEND
PARAMETER
VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 6

LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



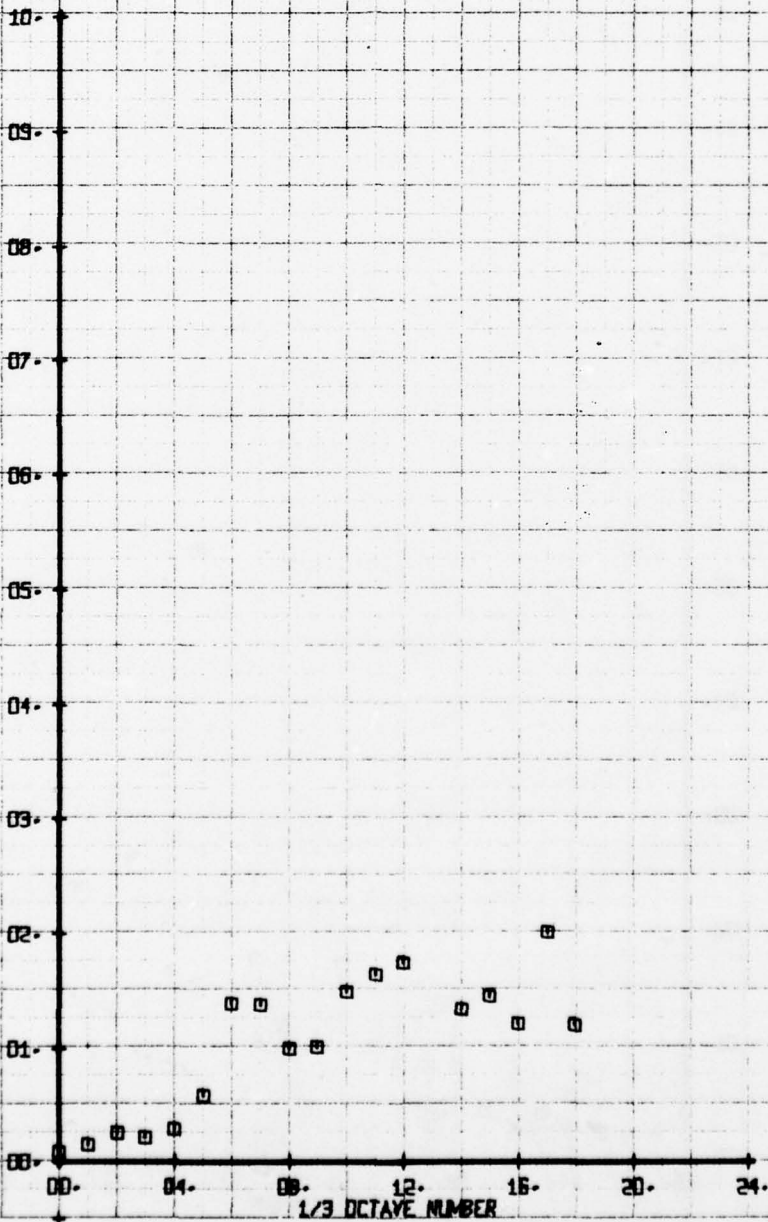
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 7

SYM
□

CH
74

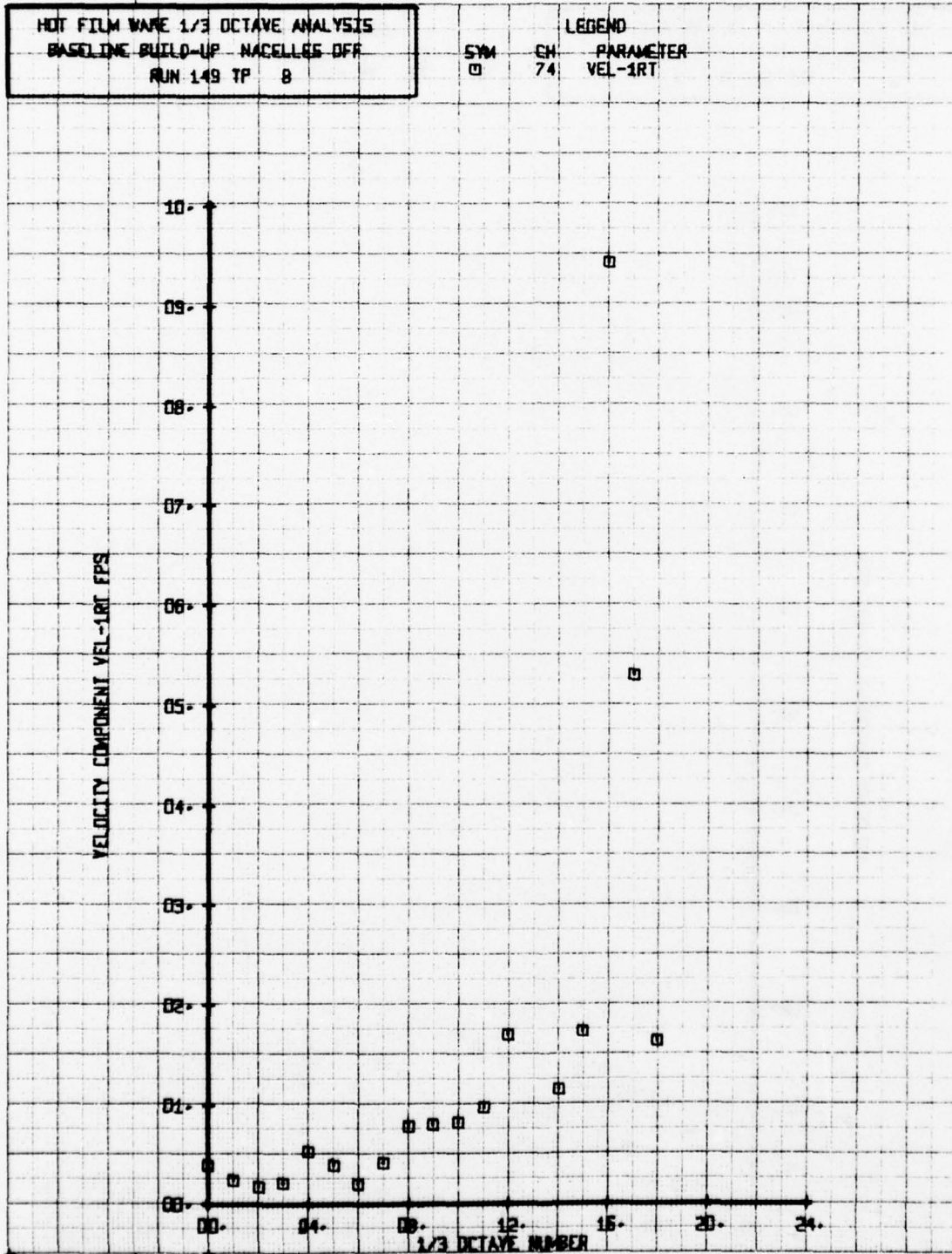
LEGEND
PARAMETER
VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



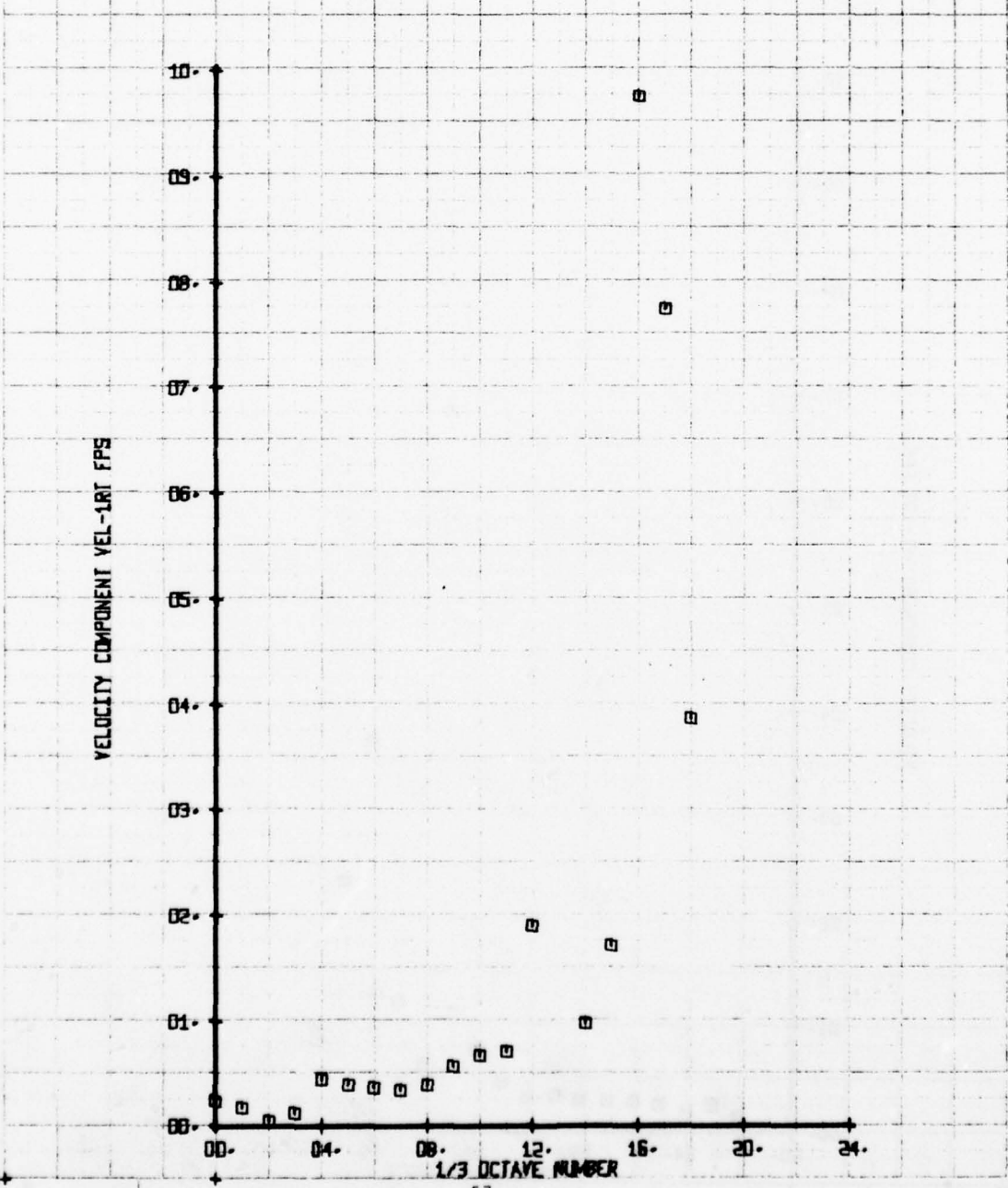
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 8

LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



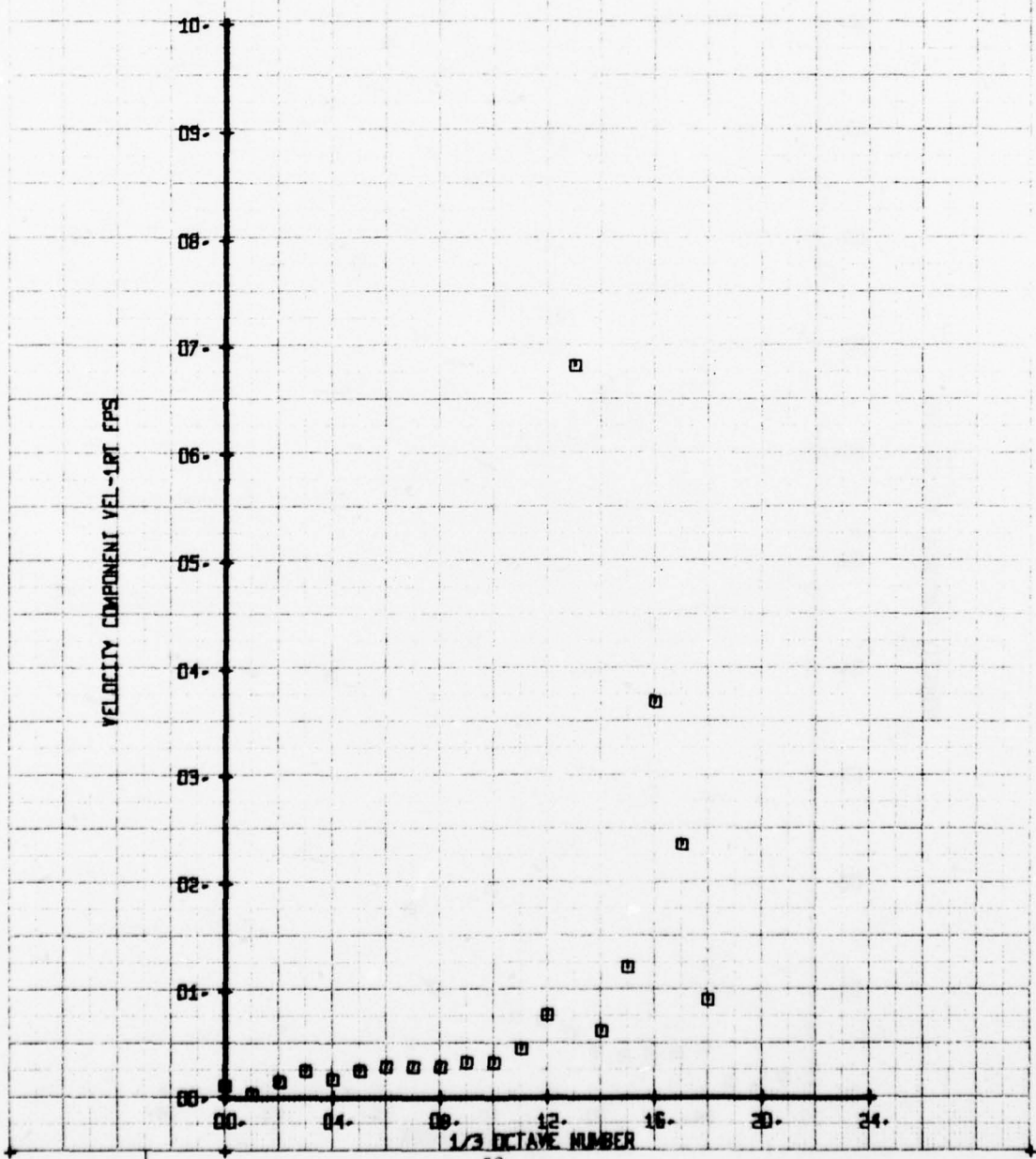
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 9

SYN CH PARAMETER
 □ 74 VEL-1RT



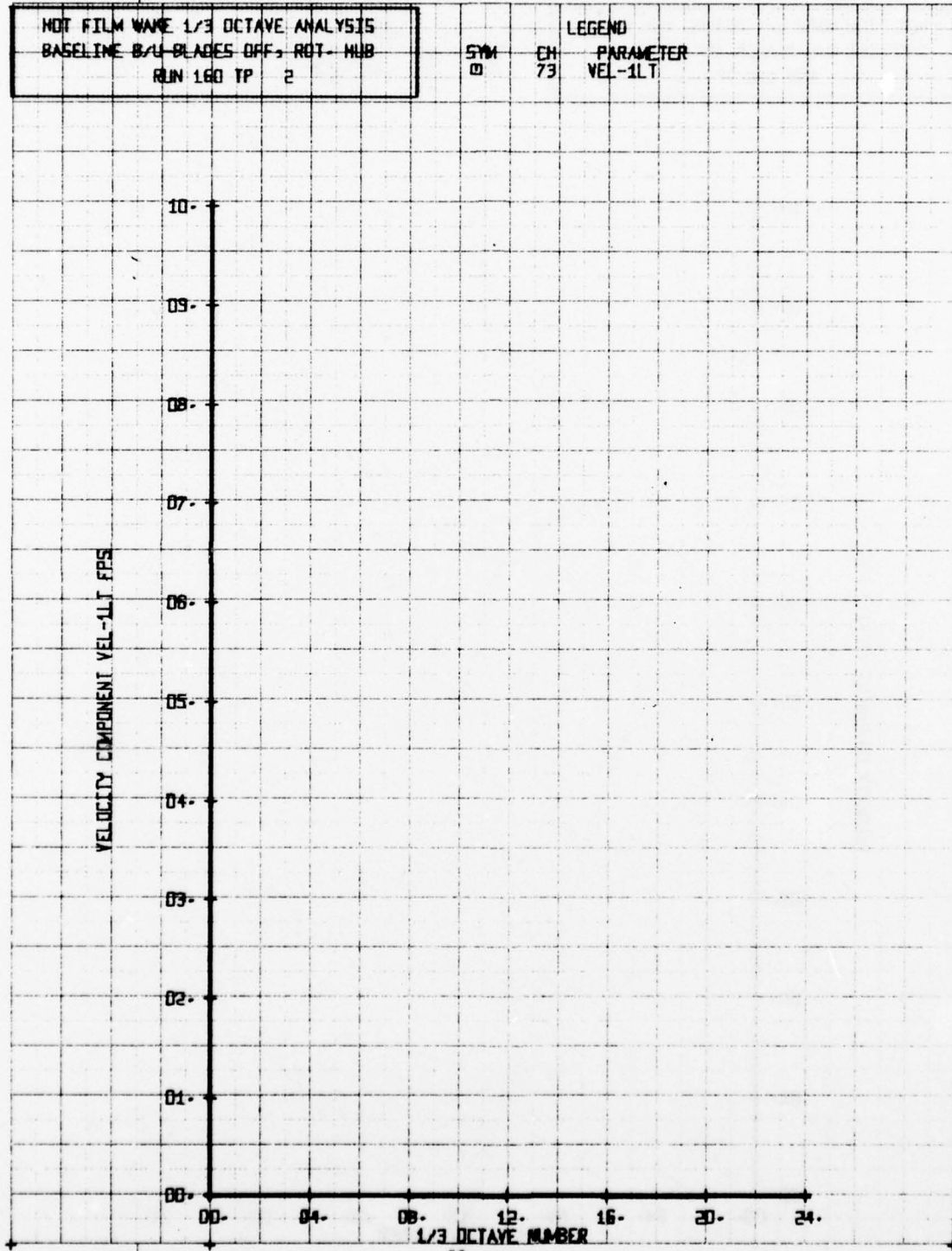
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP MACELLES OFF
RUN 149 TP 10

LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE B/L BLADES OFF, ROT. HUB
RUN 160 TP 2

LEGEND		
SYM	CH	PARAMETER
□	73	VEL-1LT

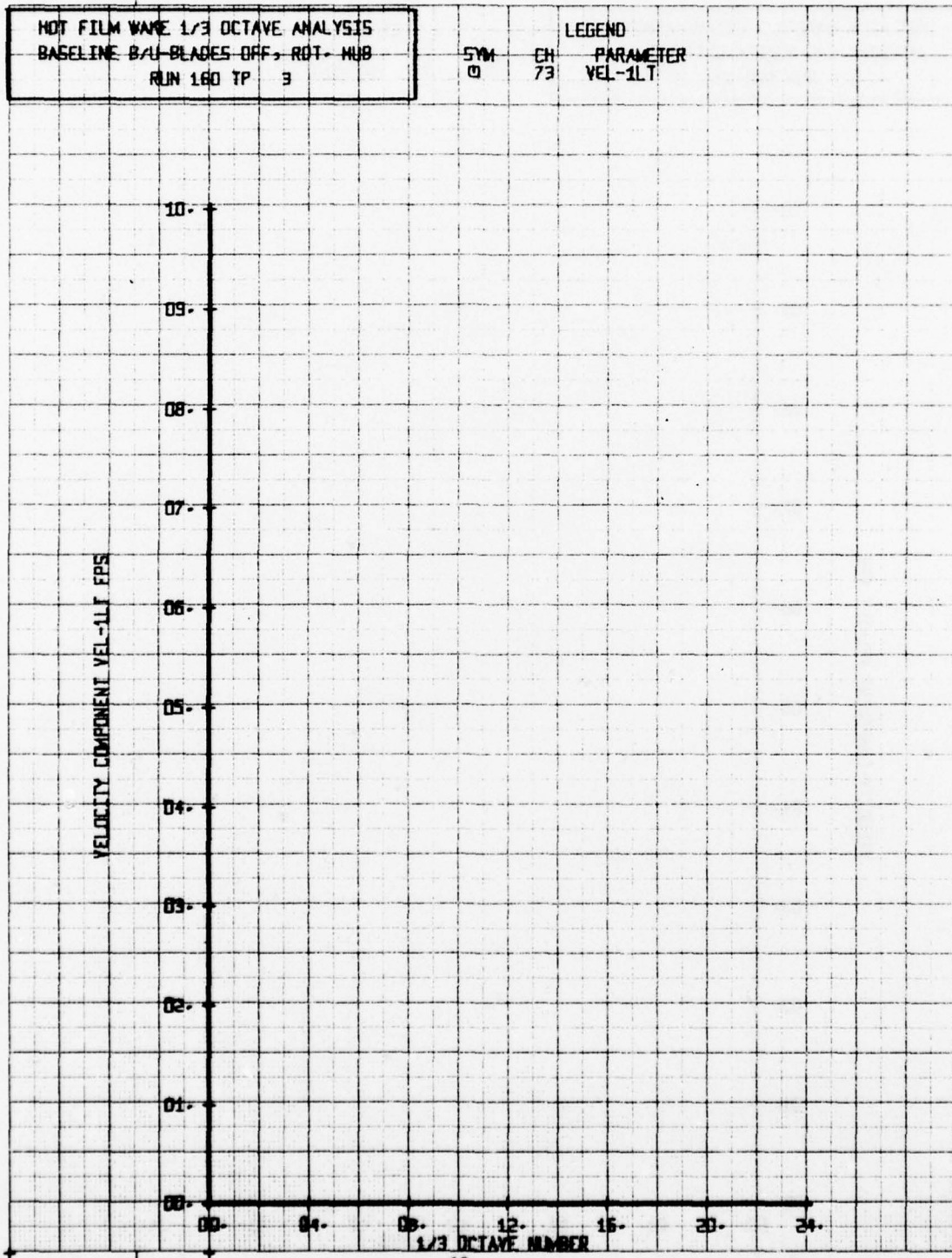


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U BLADES OFF, ROT. HUB
RUN 160 TP 3

SYM
0

CH
73

LEGEND
PARAMETER
VEL-1LT

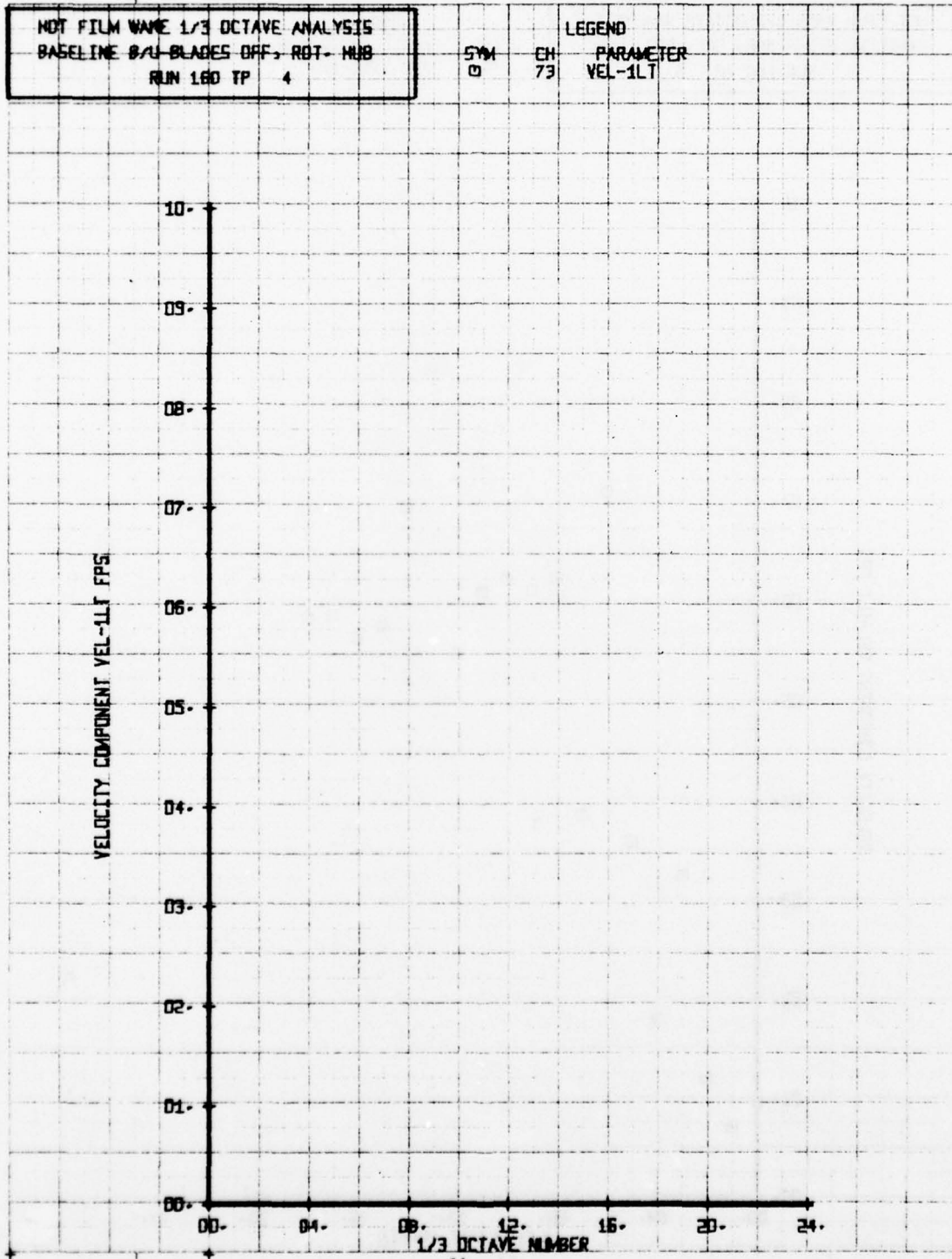


NOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE 8/11 BLADES OFF, ROT. HUB
RUN 160 TP 4

SYM
□

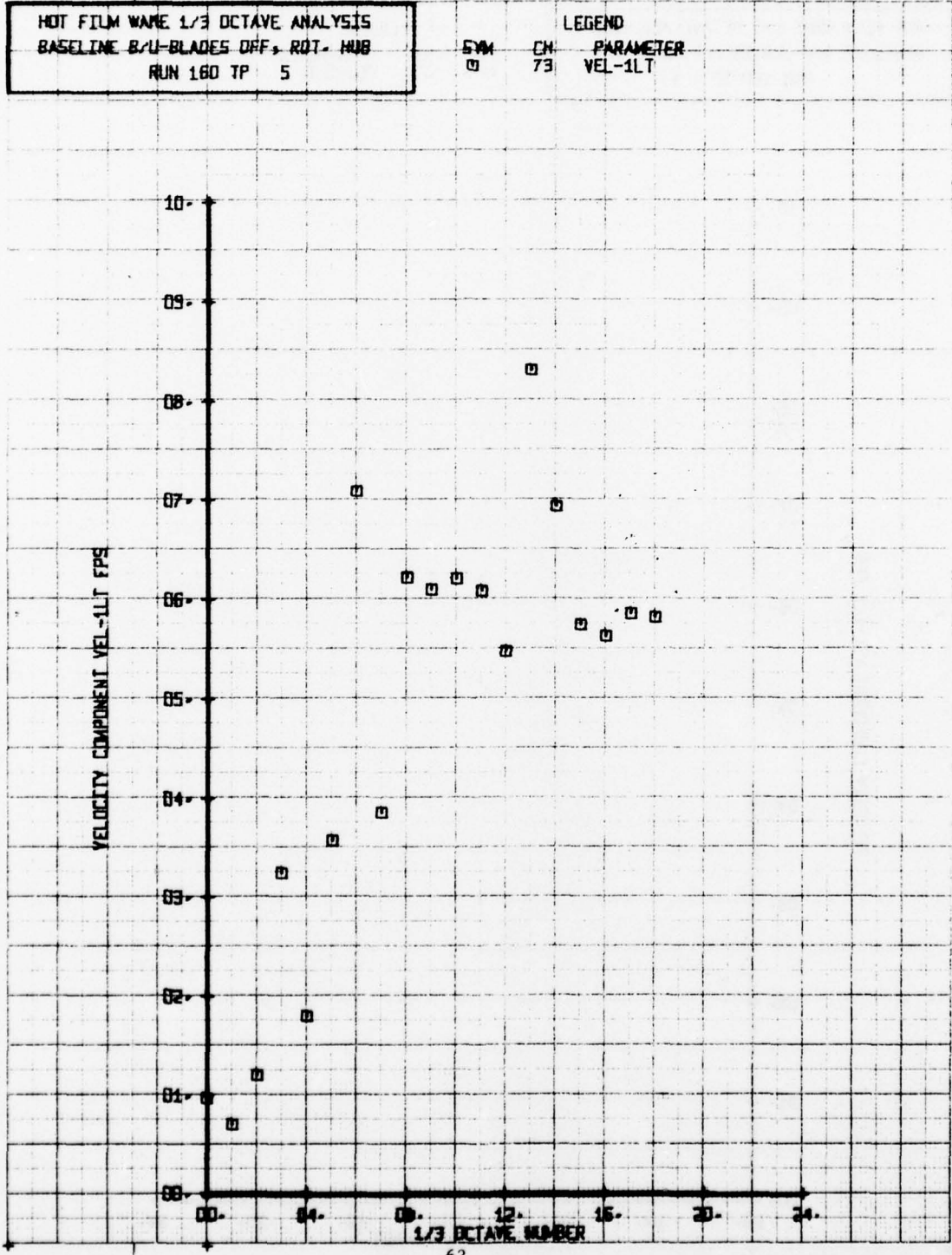
EN
73

LEGEND
PARAMETER
VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 5

SYM CH PARAMETER
 □ 73 VEL-1LT

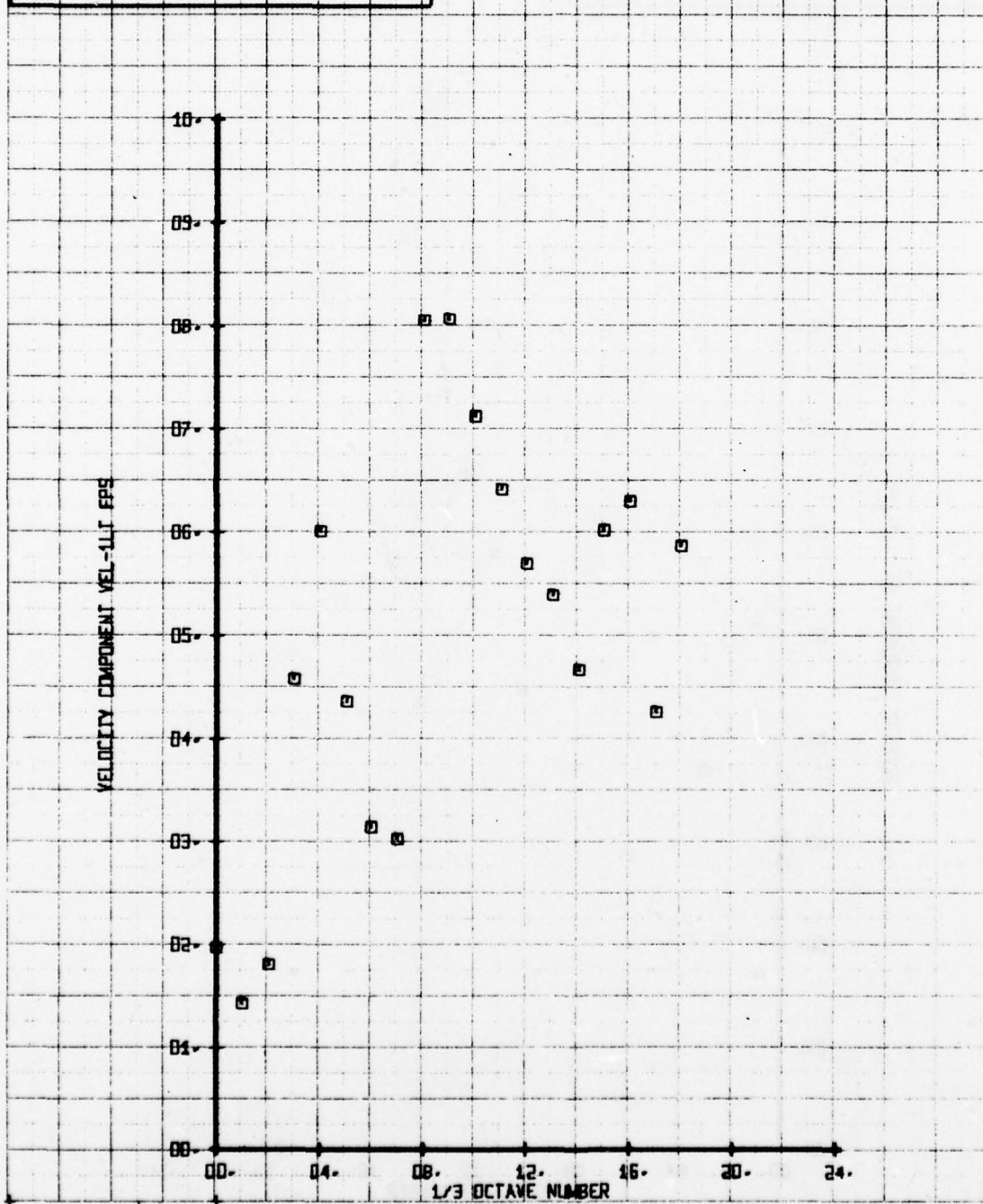


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/L-BLADES DRF. ROT. HUB
 RUN 180 TP 6

SYM
 □

CH
 73

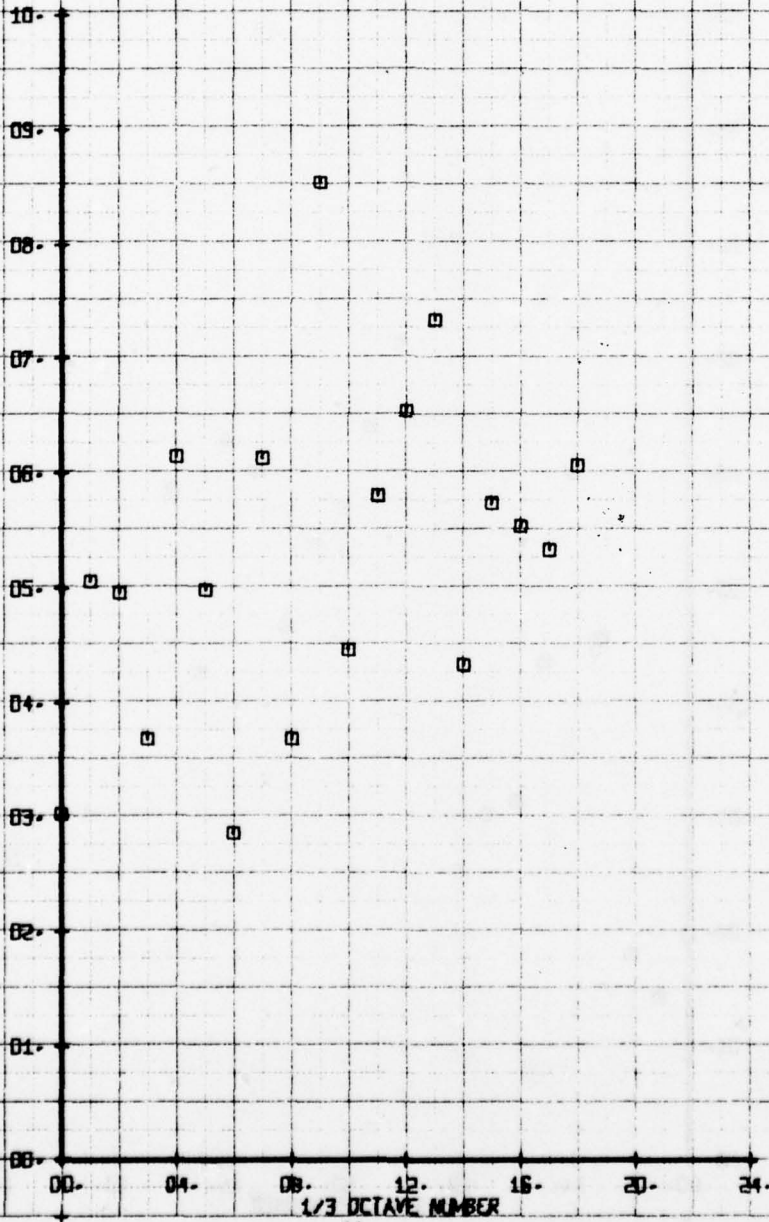
LEGEND
 PARAMETER
 VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 841-BLADES OFF, ROT- HUB
RUN 160 TP 7

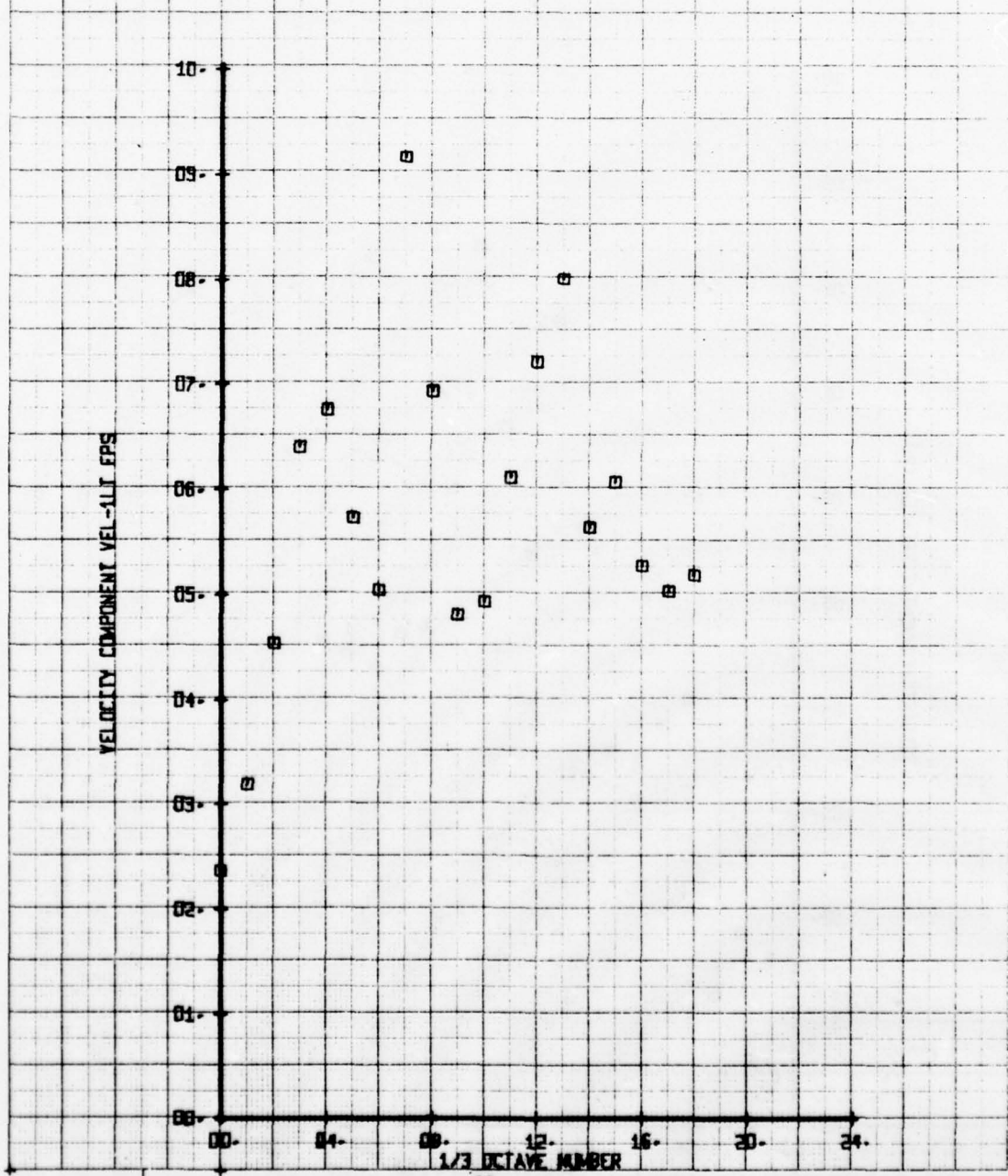
SYM CH PARAMETER
□ 73 VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



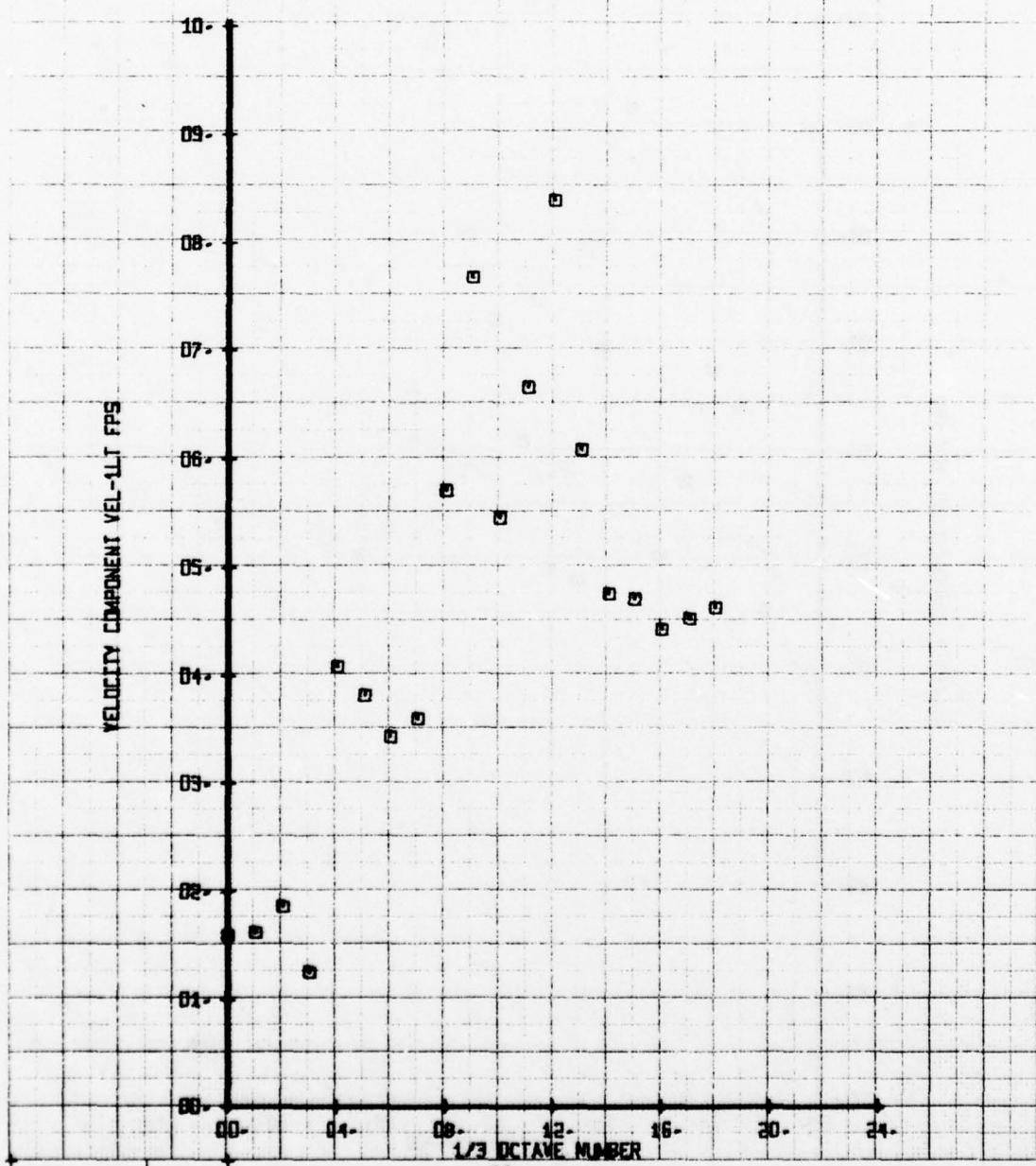
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADGES OFF, ROT-HUB
 RUN 160 TP B

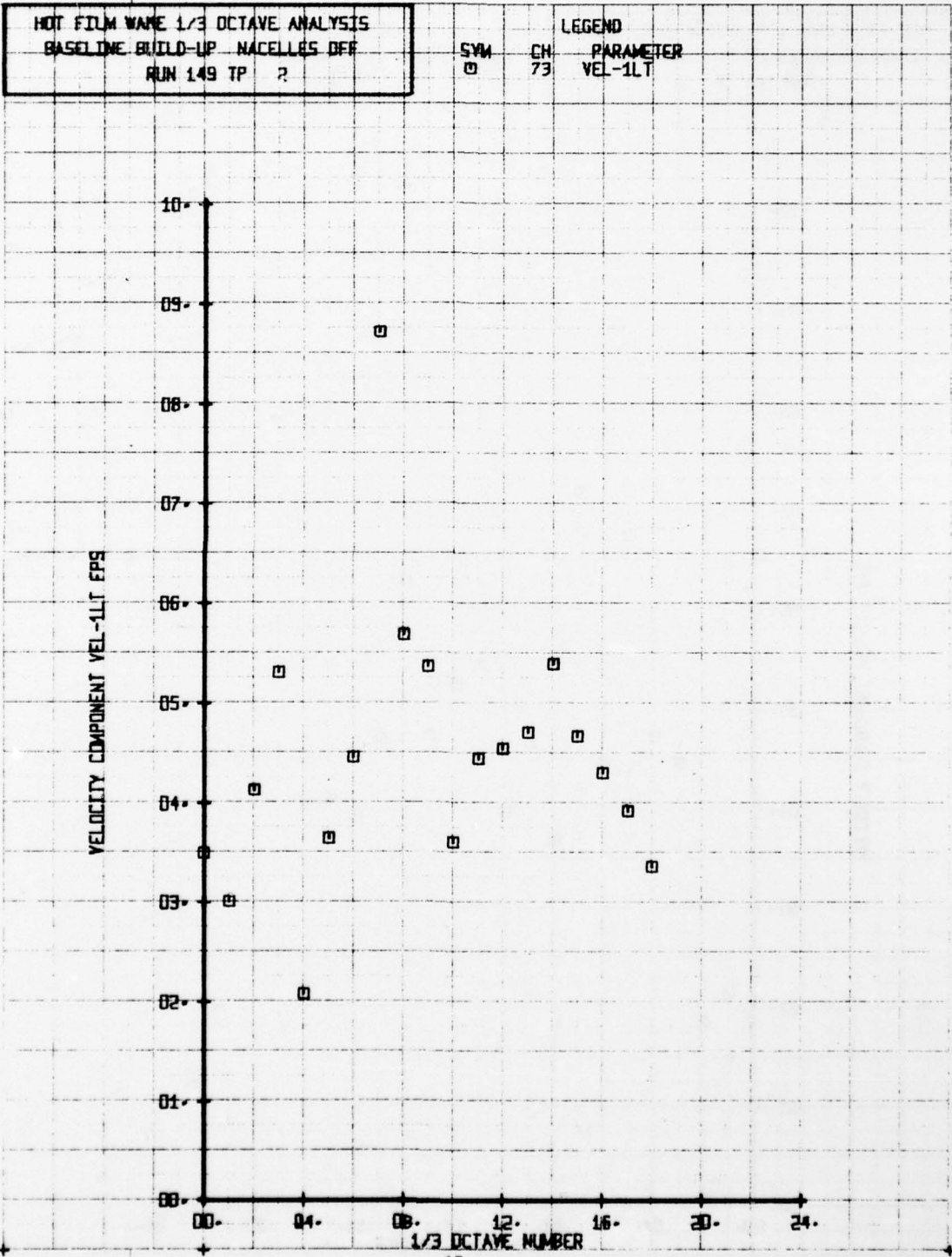
SYM CH PARAMETER
 □ 73 VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 9

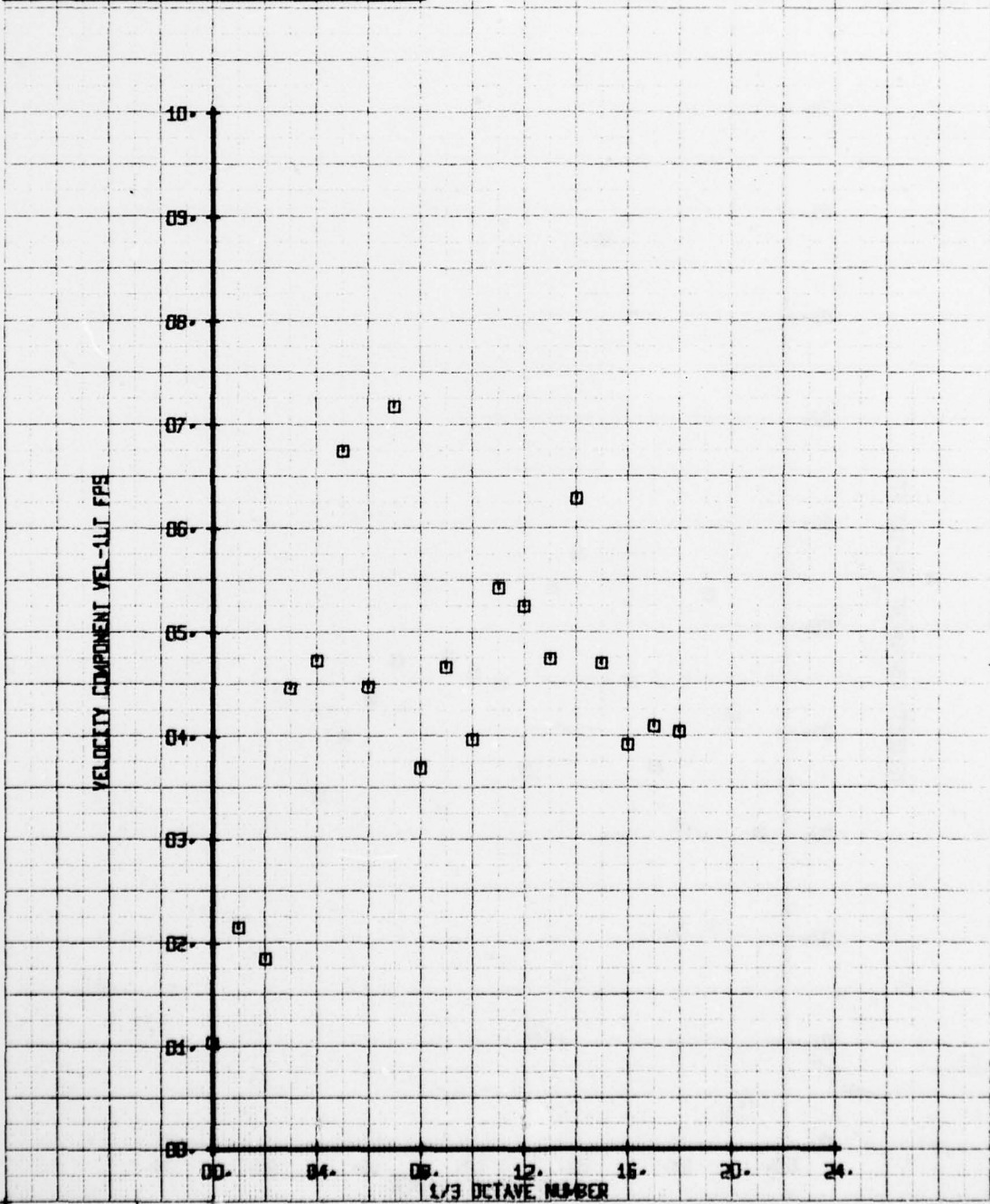
LEGEND
 CH- PARAMETER
 73 VEL-1LT





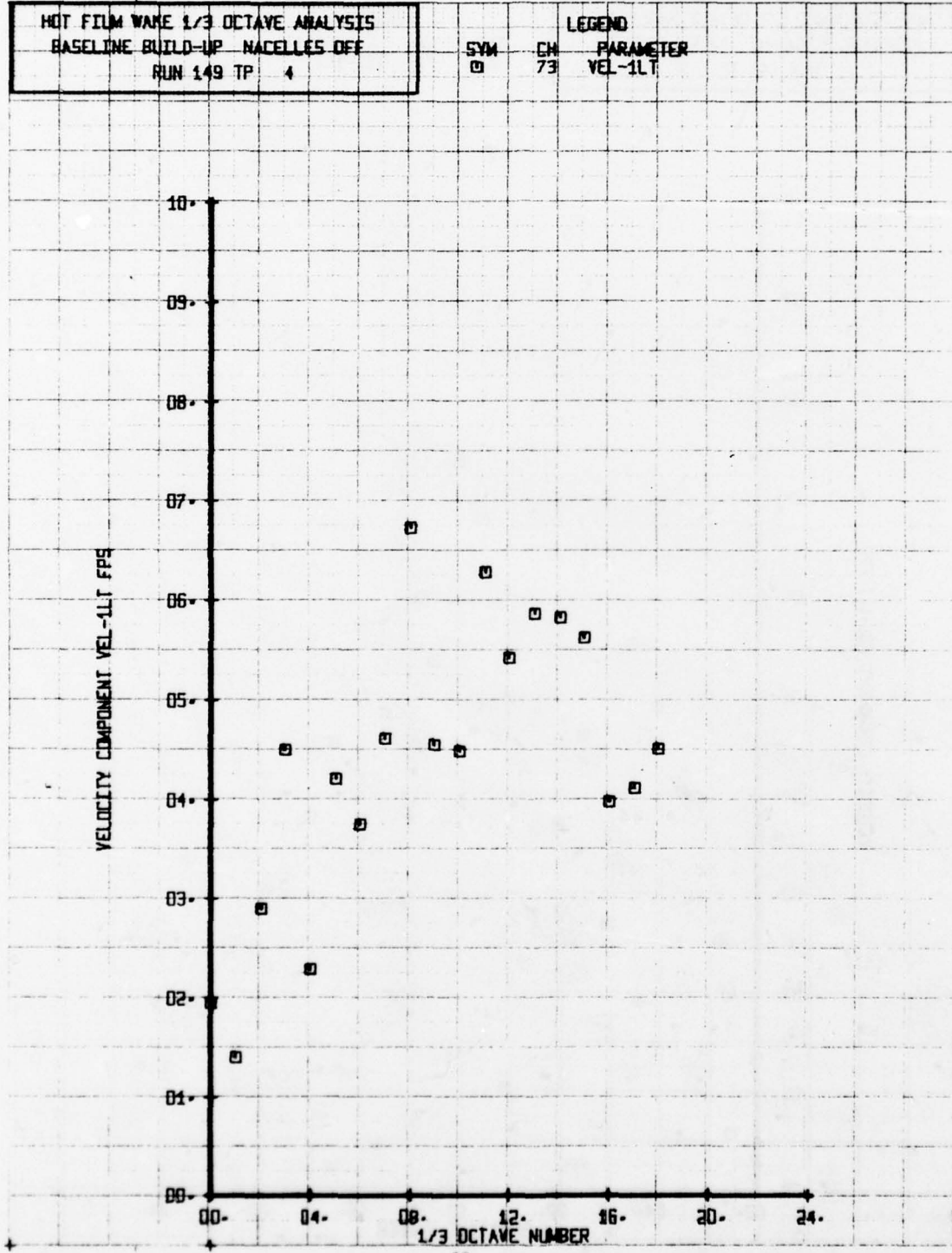
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 3

SYN CH PARAMETER
 □ 73 VEL-1LT



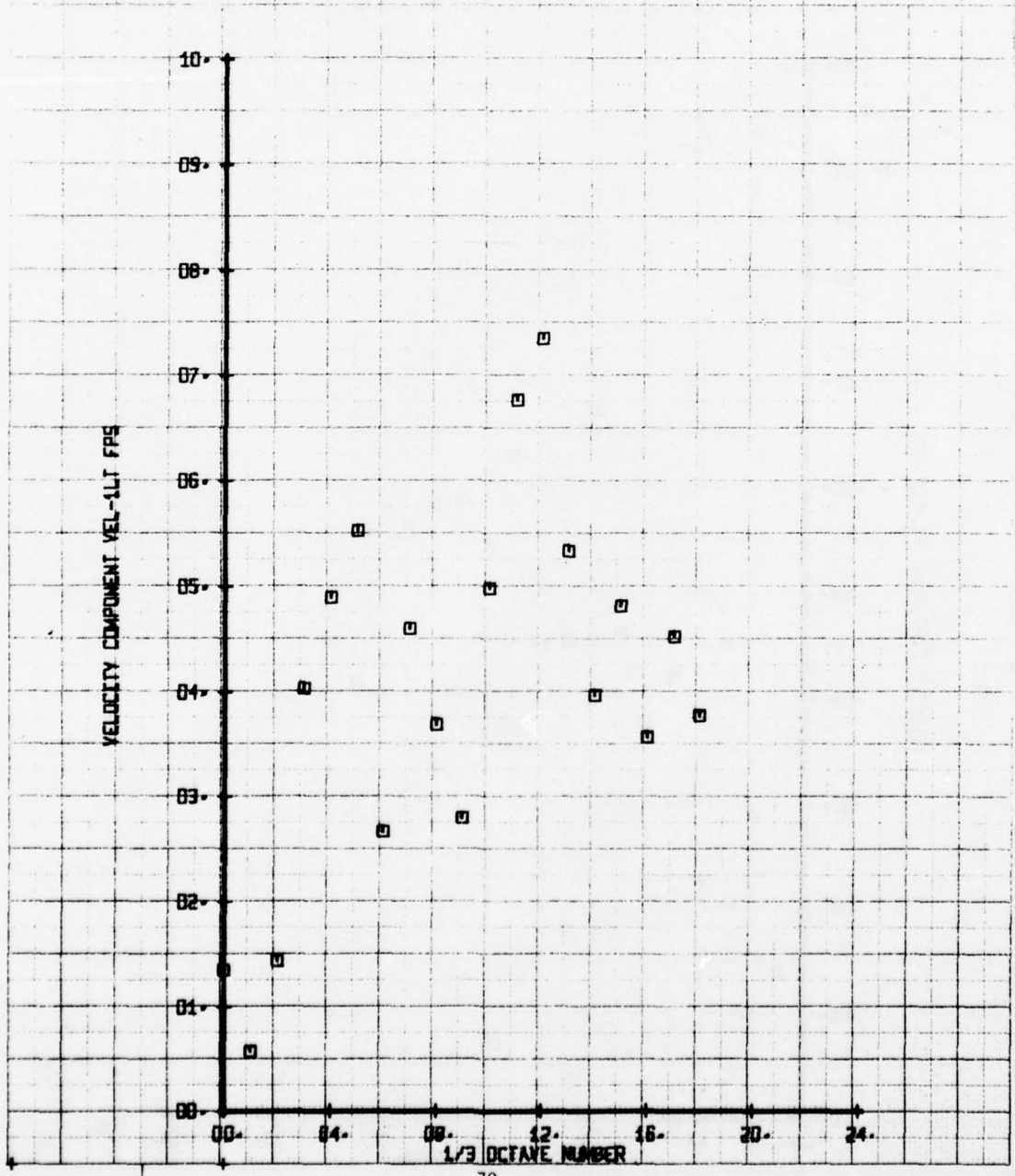
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 4

SYM	CH	PARAMETER
□	73	VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 5

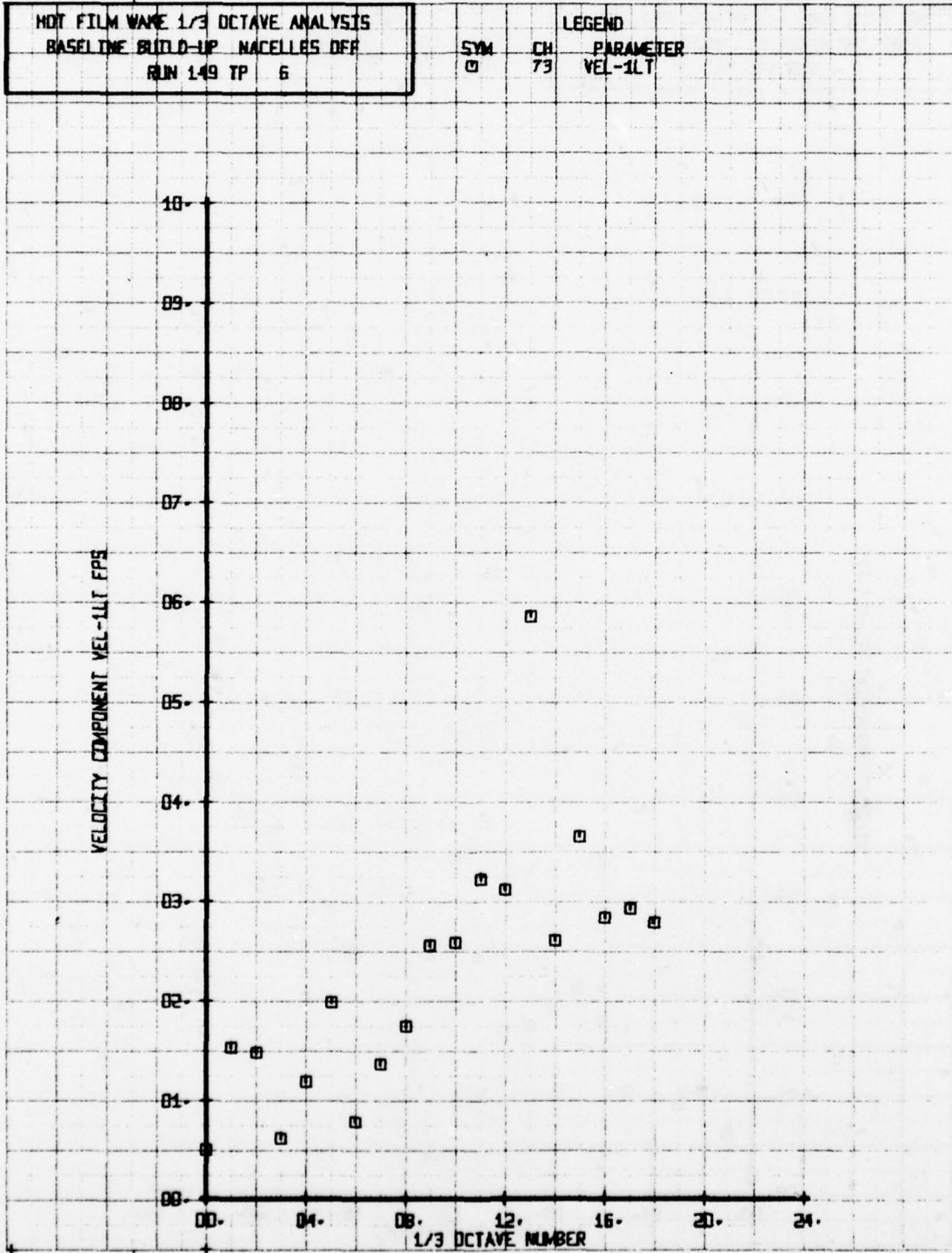
LEGEND
SYM CH PARAMETER
□ 73 VEL-1LT



HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 6

SYM	CH	LEGEND
□	73	PARAMETER VEL-1LT

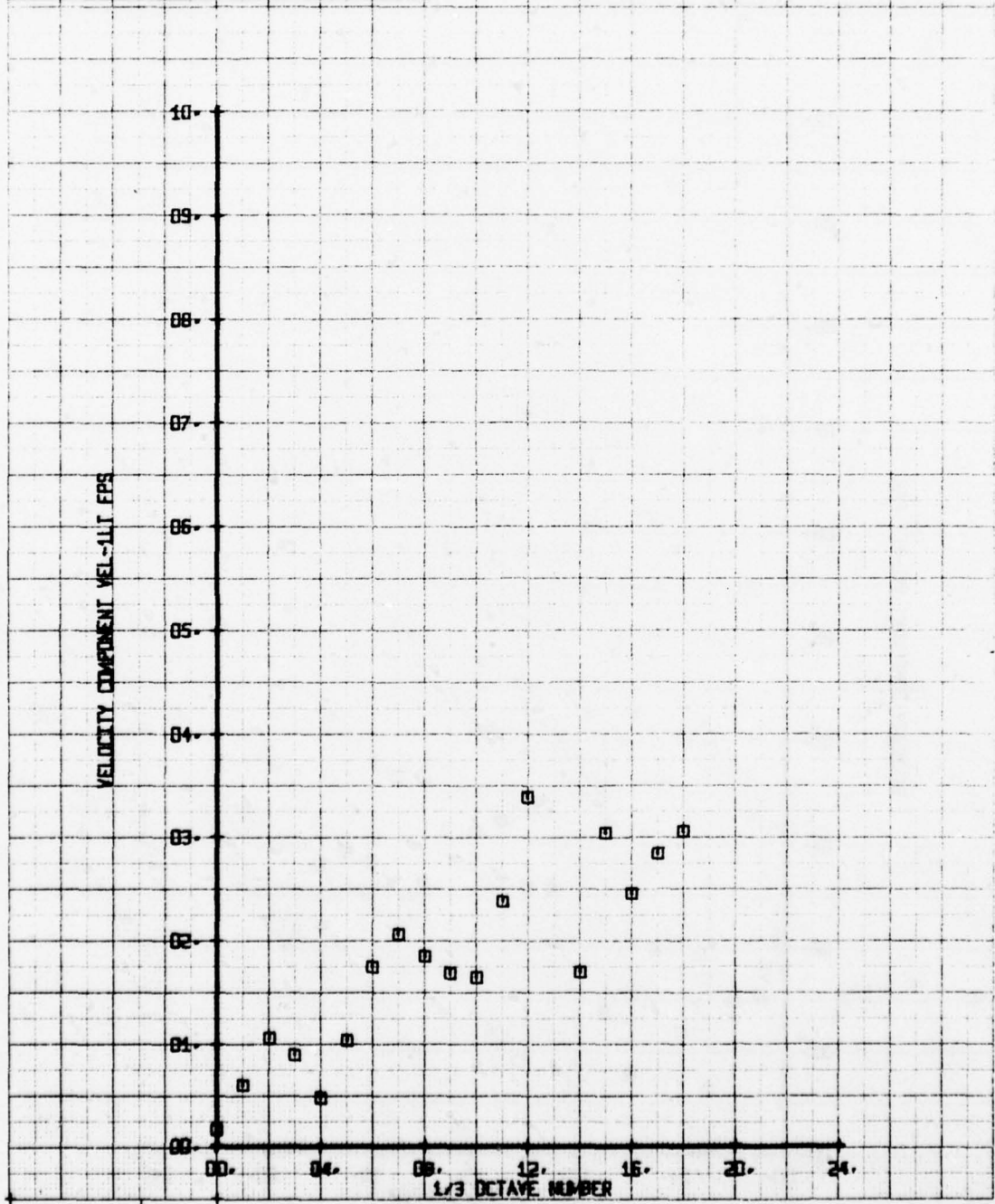
VELOCITY COMPONENT VEL-1LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES DEF
RUN 149 TP 7

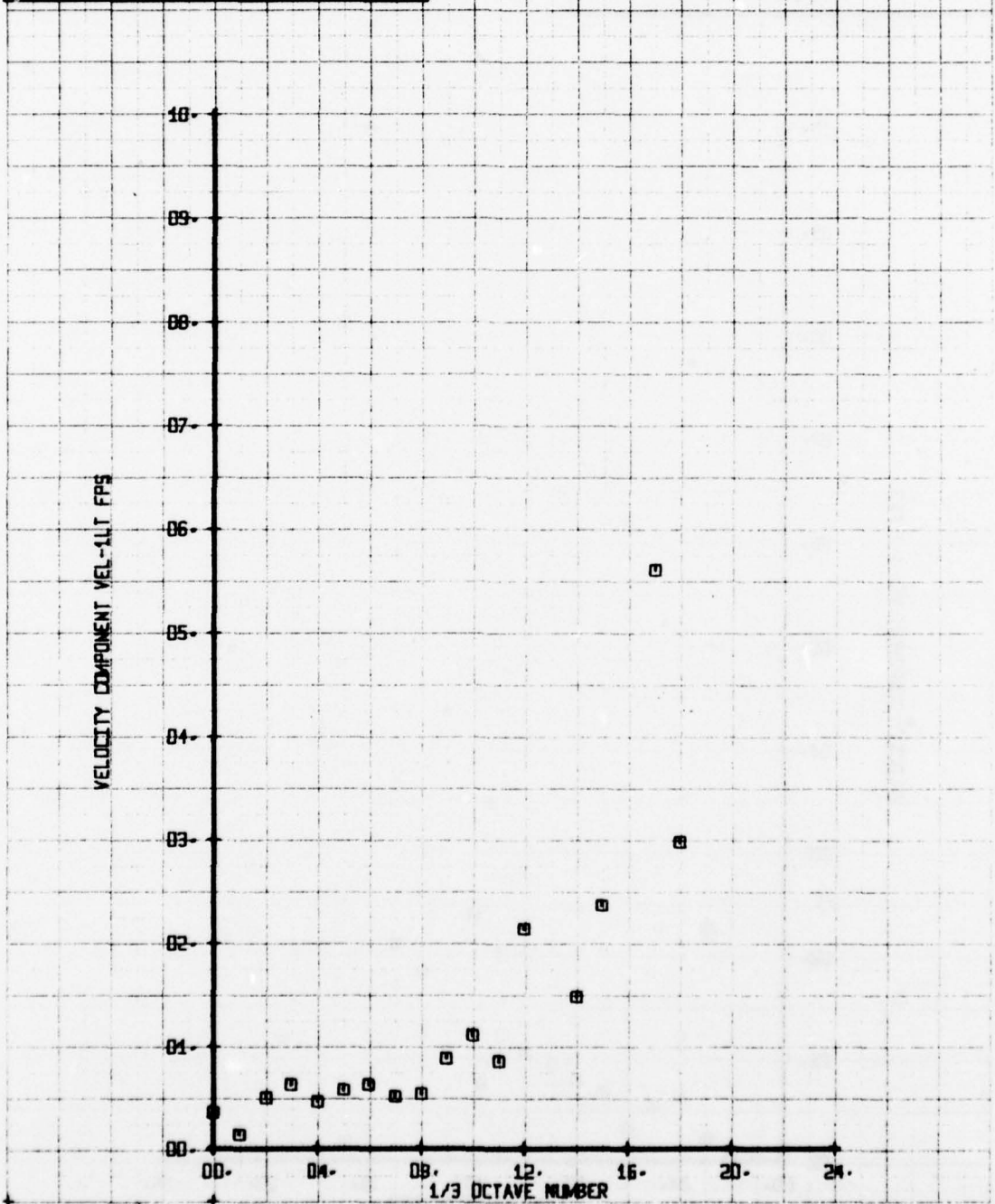
SYM	CH	PARAMETER
□	73	VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



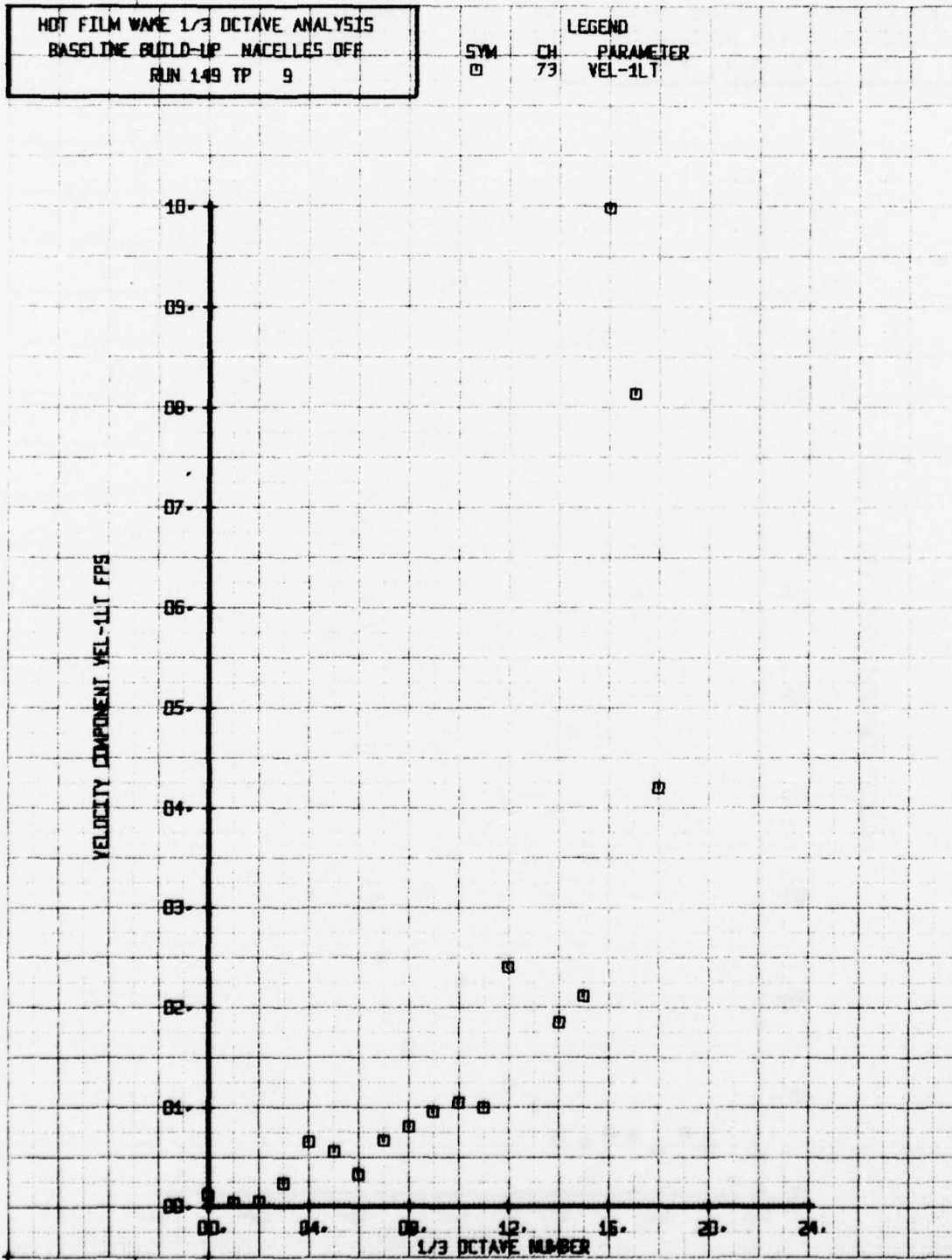
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES DEF
 RUN 149 TP B

SYM	CH	PARAMETER
□	73	VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 9

SYM	CH	PARAMETER
□	73	VEL-1LT



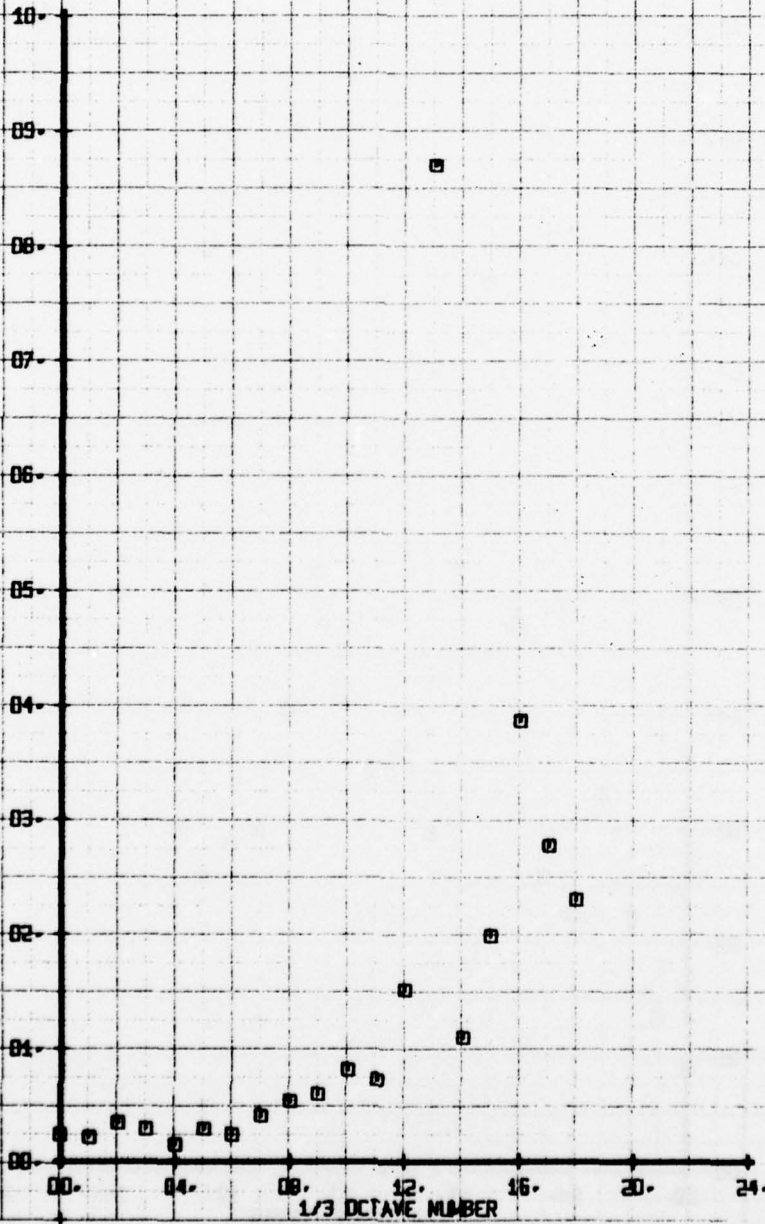
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES DEF
RUN 149 TP 10

SYM
□

CH
73

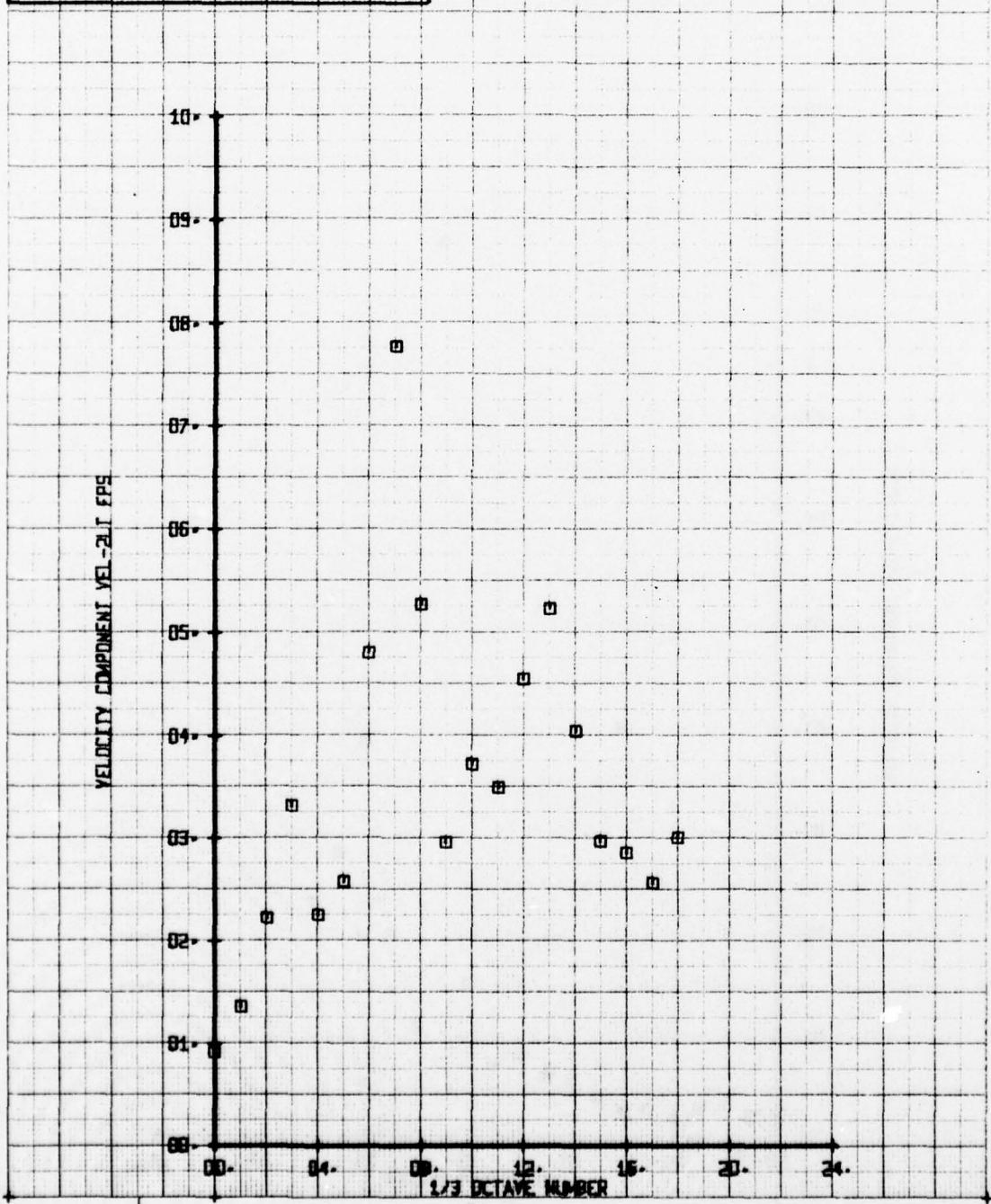
LEGEND
PARAMETER
VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



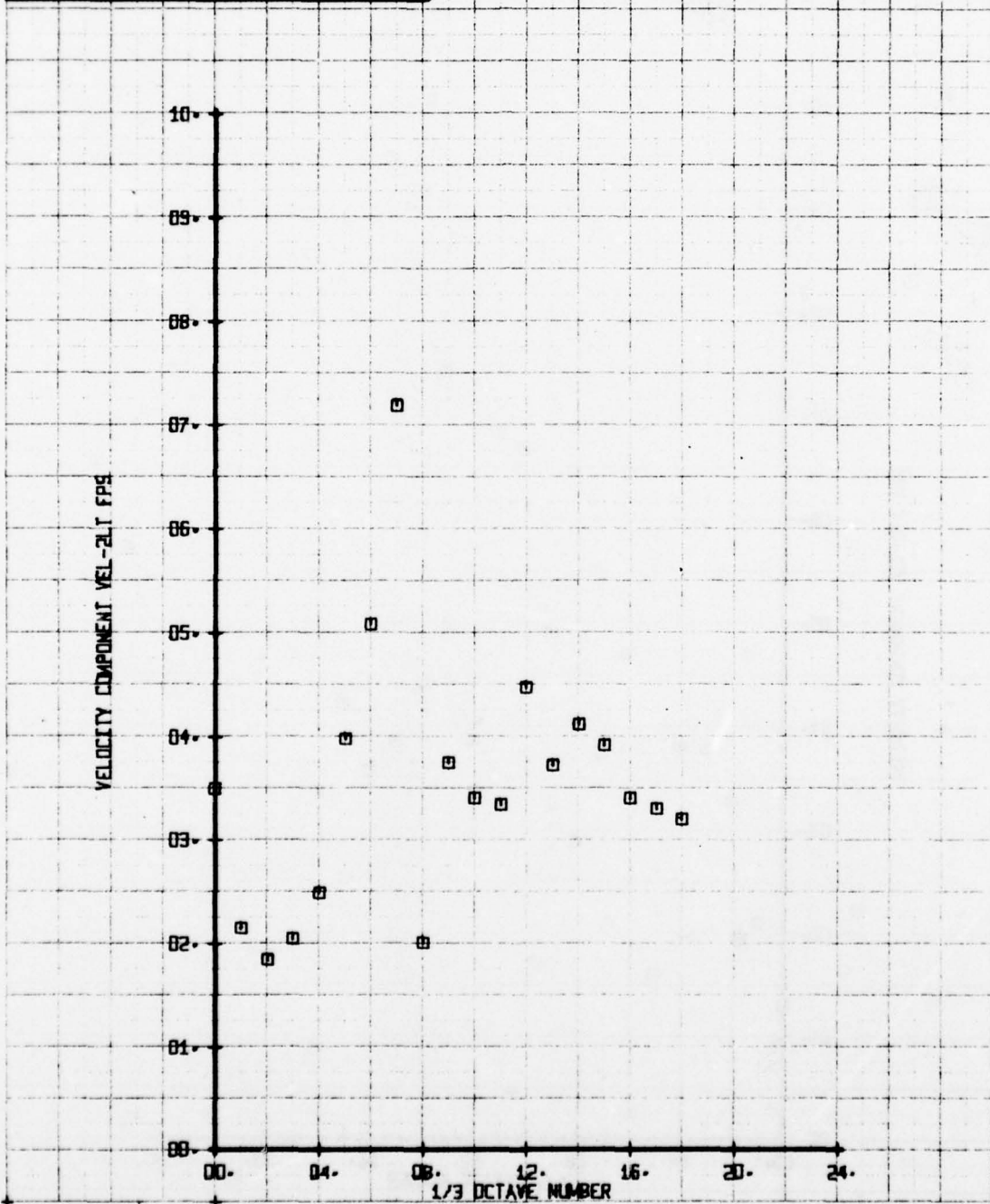
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 2

SYM	CN	PARAMETER
□	72	VEL-2LT



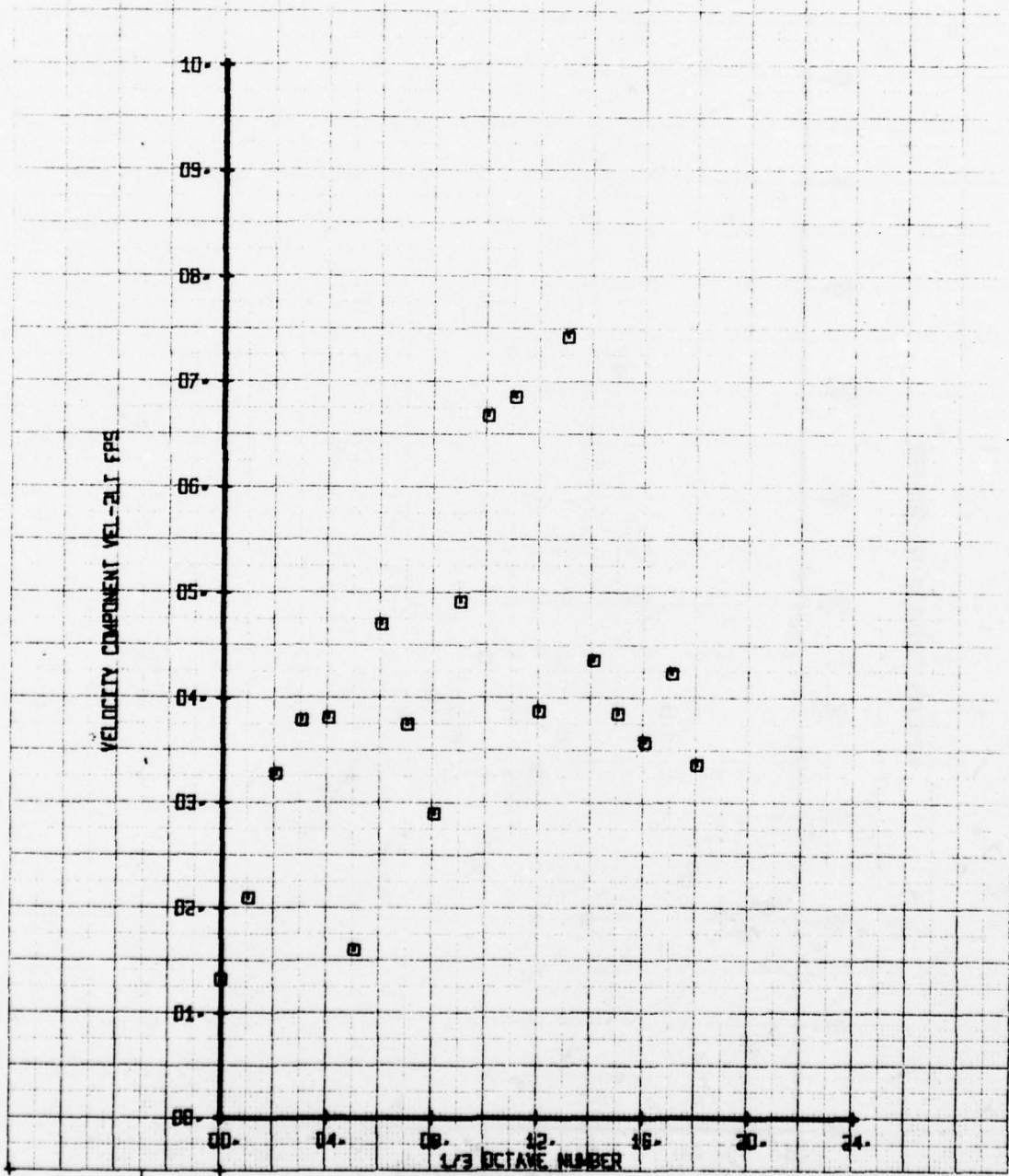
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 3

LEGEND
 SWM CH PARAMETER
 □ 72 VEL-2LT



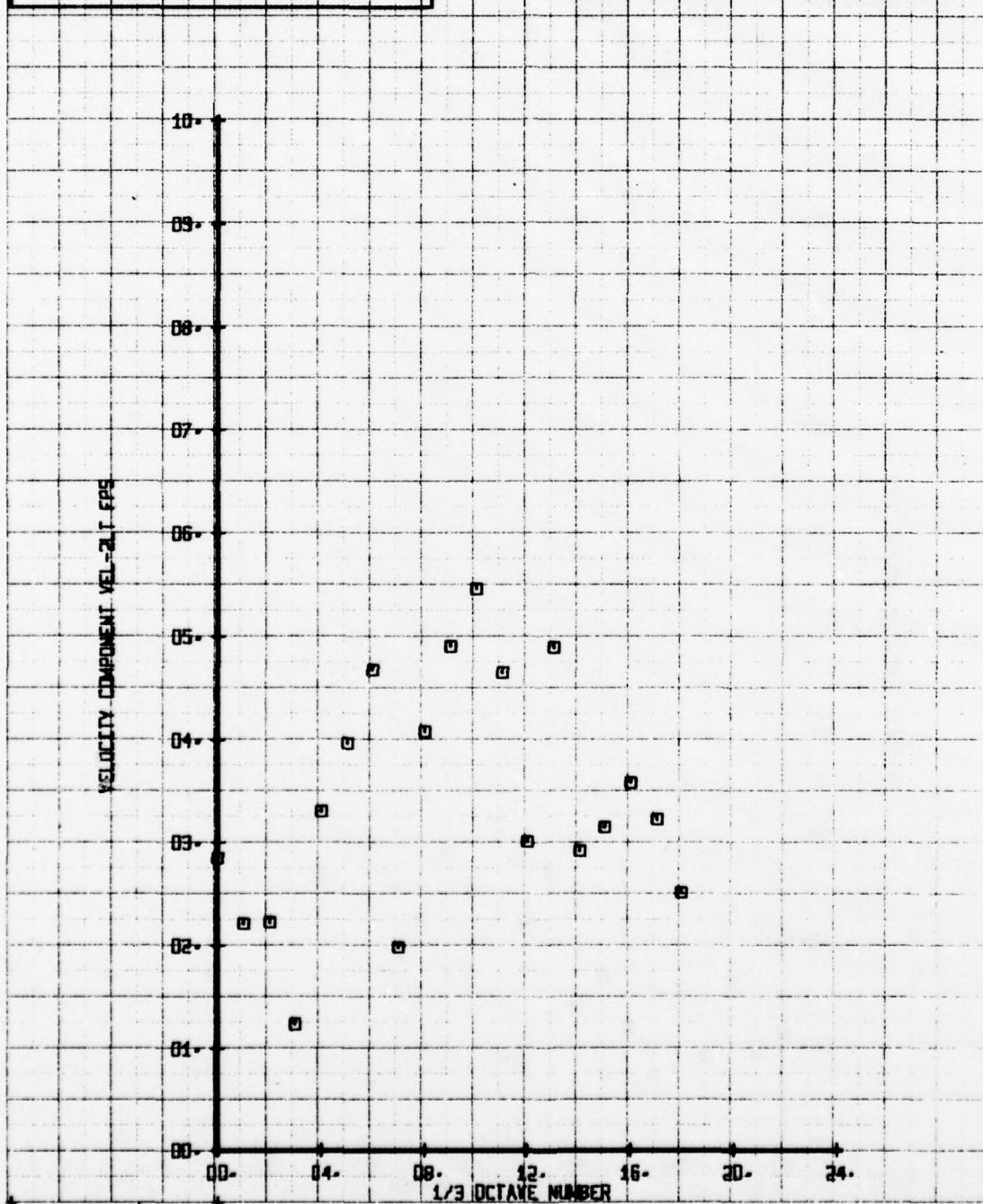
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 4

LEGEND
 CH PARAMETER
 72 VEL-2LT



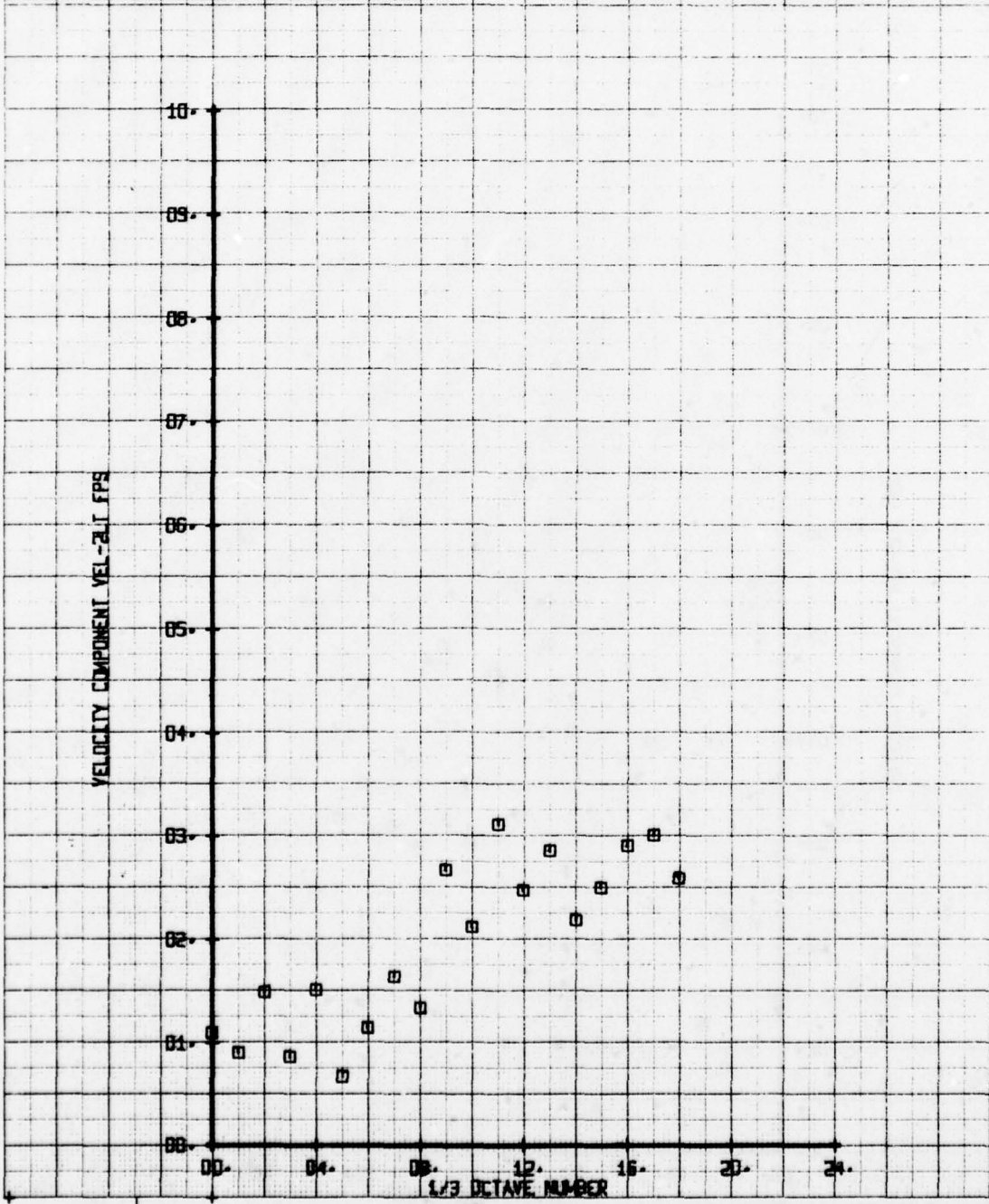
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 5

SYM CH PARAMETER
□ 72 VEL-2LT



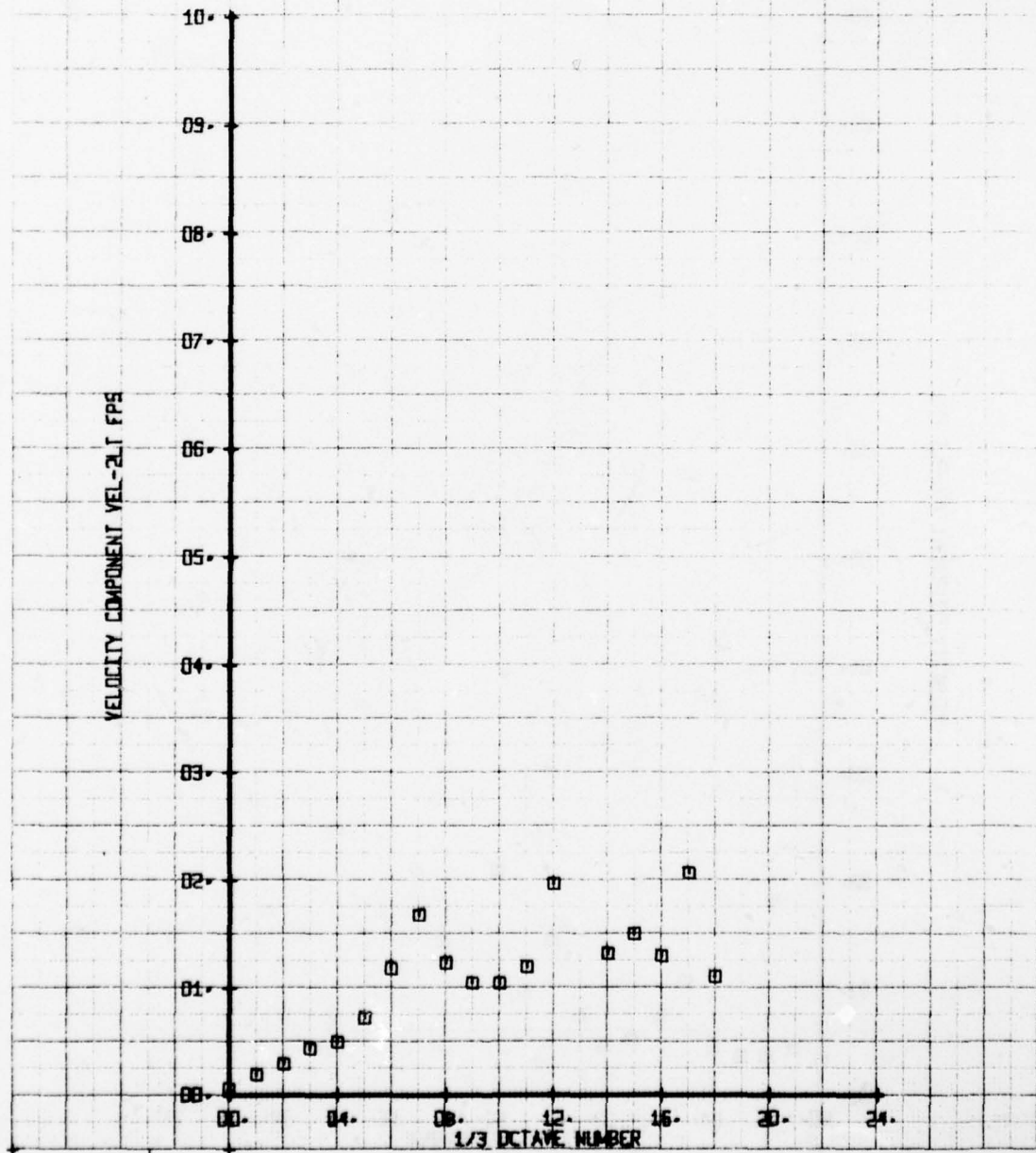
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 6

SYM	CH	PARAMETER
□	72	VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES DEF
RUN 149 TP 7

LEGEND
SYM CH PARAMETER
□ 72 VEL-2LT

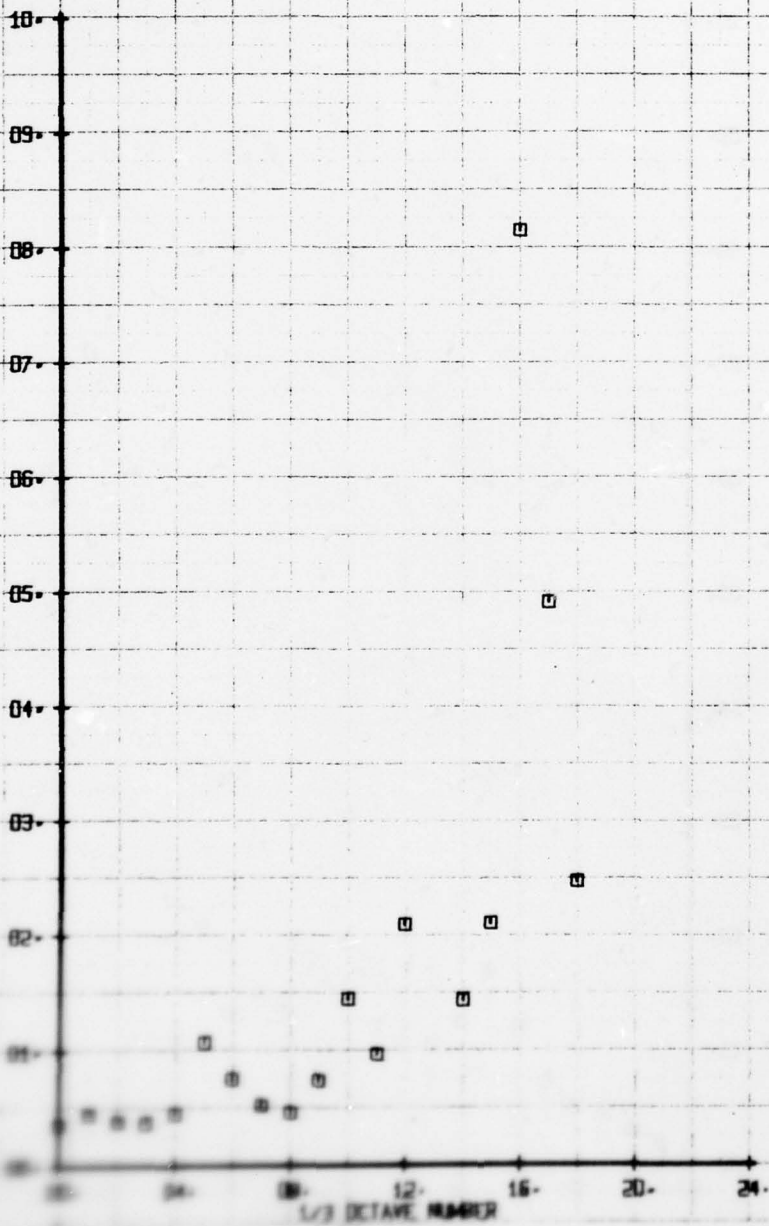


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 8

SYM	CH	PARAMETER
□	72	VEL-2LT

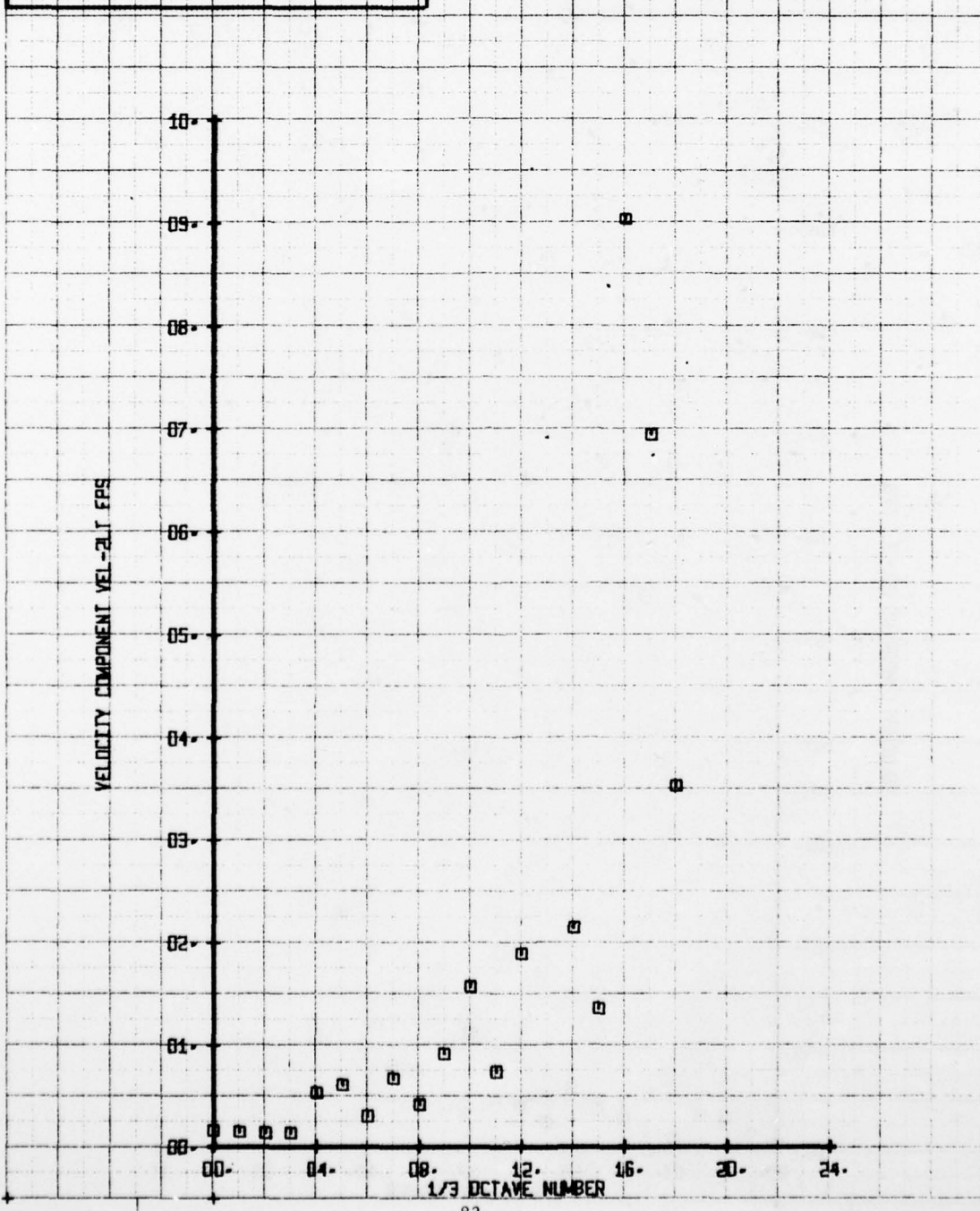
LEGEND

VELOCITY COMPONENT VEL-2LT FPS



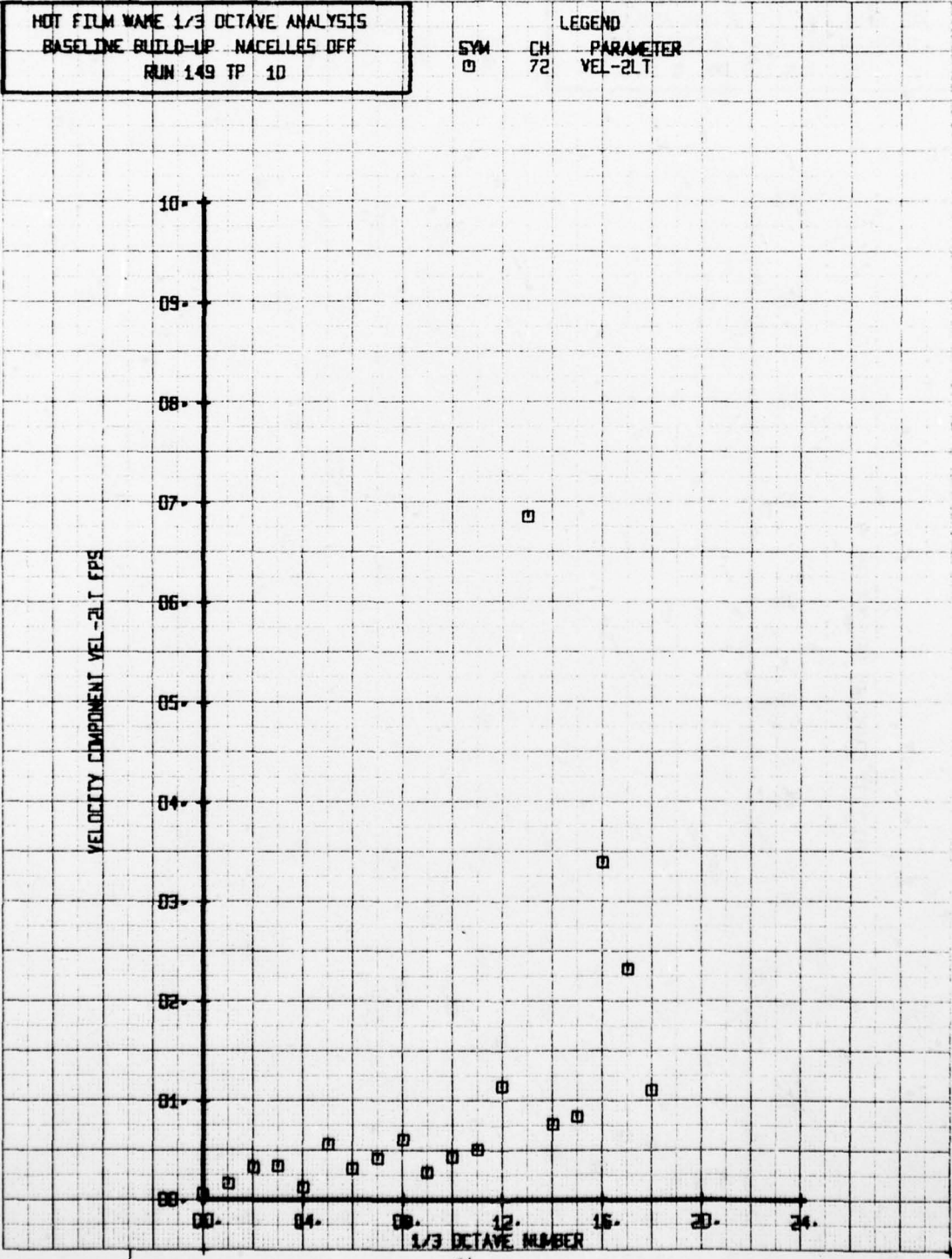
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP MACELLES OFF
 RUN 149 TP 9

LEGEND
 CH 72
 PARAMETER
 VEL-2LT



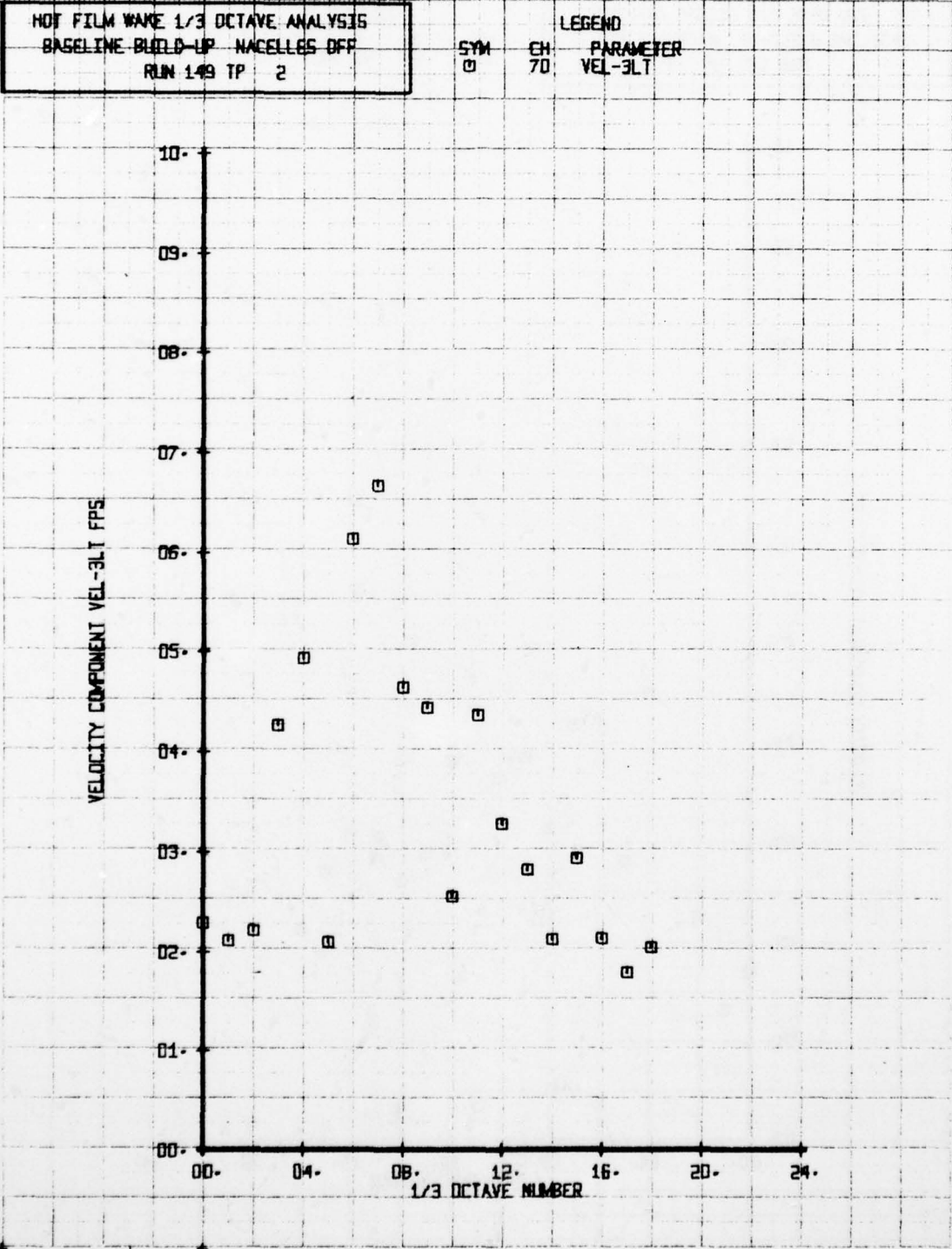
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 10

SYM	CH	LEGEND	PARAMETER
□	72		VEL-2LT



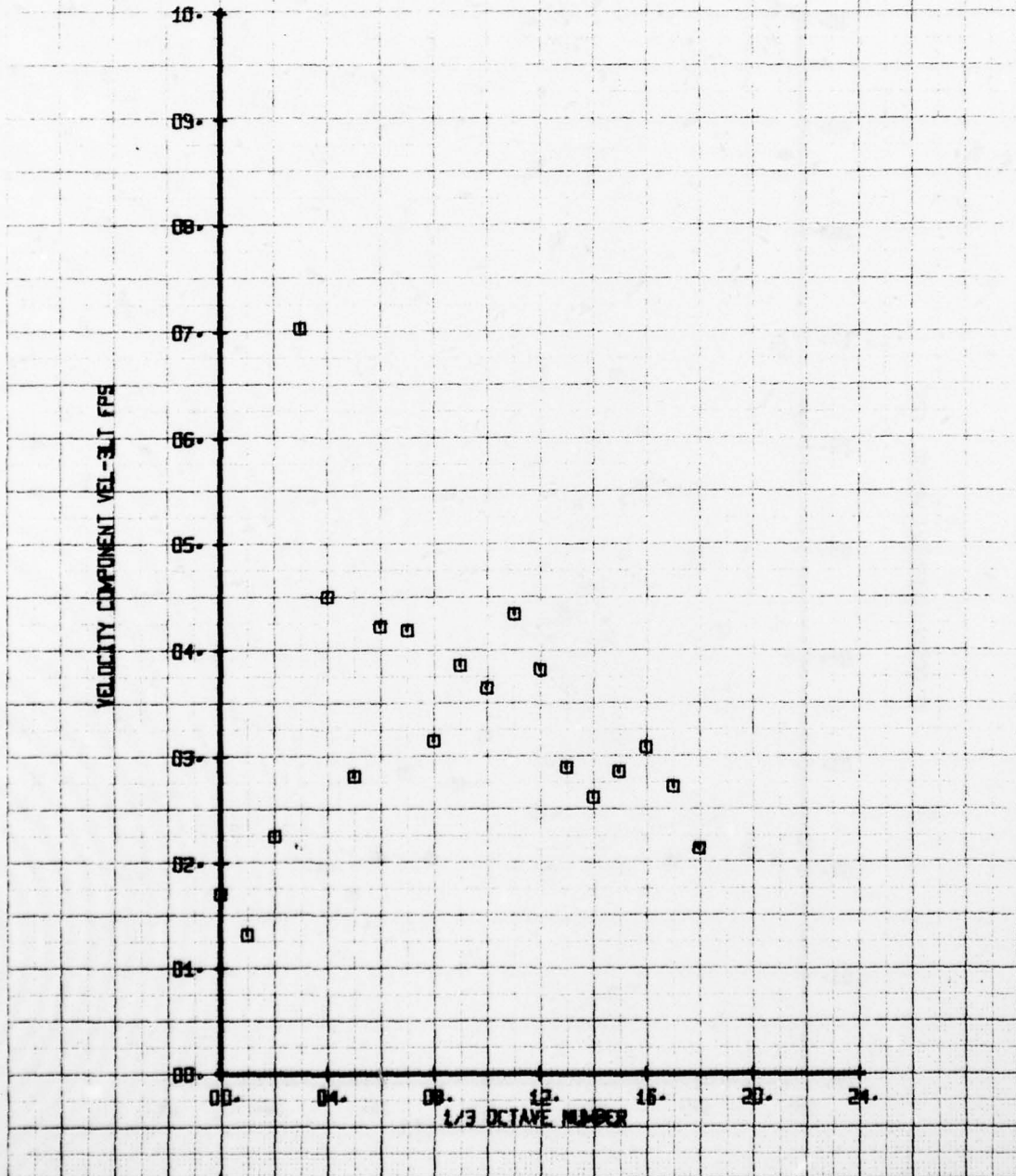
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 2

SYM CH PARAMETER
 □ 70 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 3

LEGEND
 CH 70
 PARAMETER
 VEL-3LT



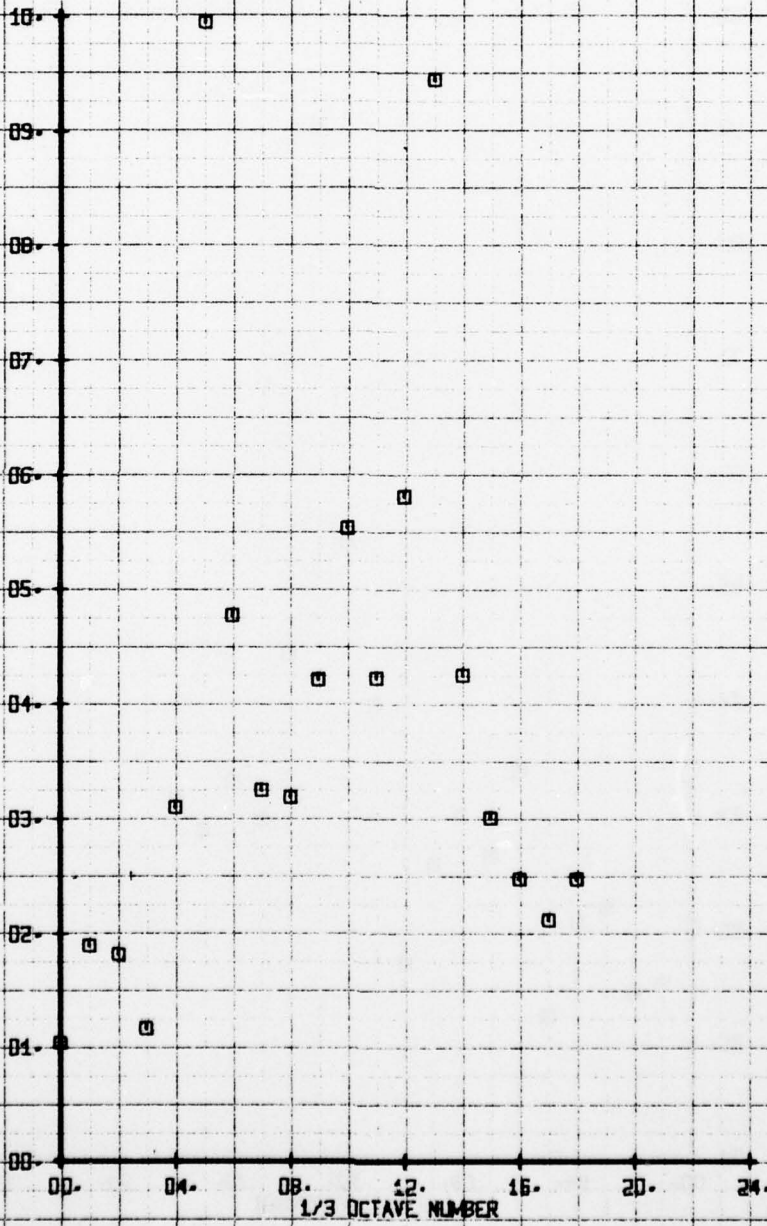
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BUILD-UP NACELLES OFF
RUN 149 TP 4

SYM
□

CH
70

LEGEND
PARAMETER
VEL-3LT

VELOCITY COMPONENT VEL-3LT FPS

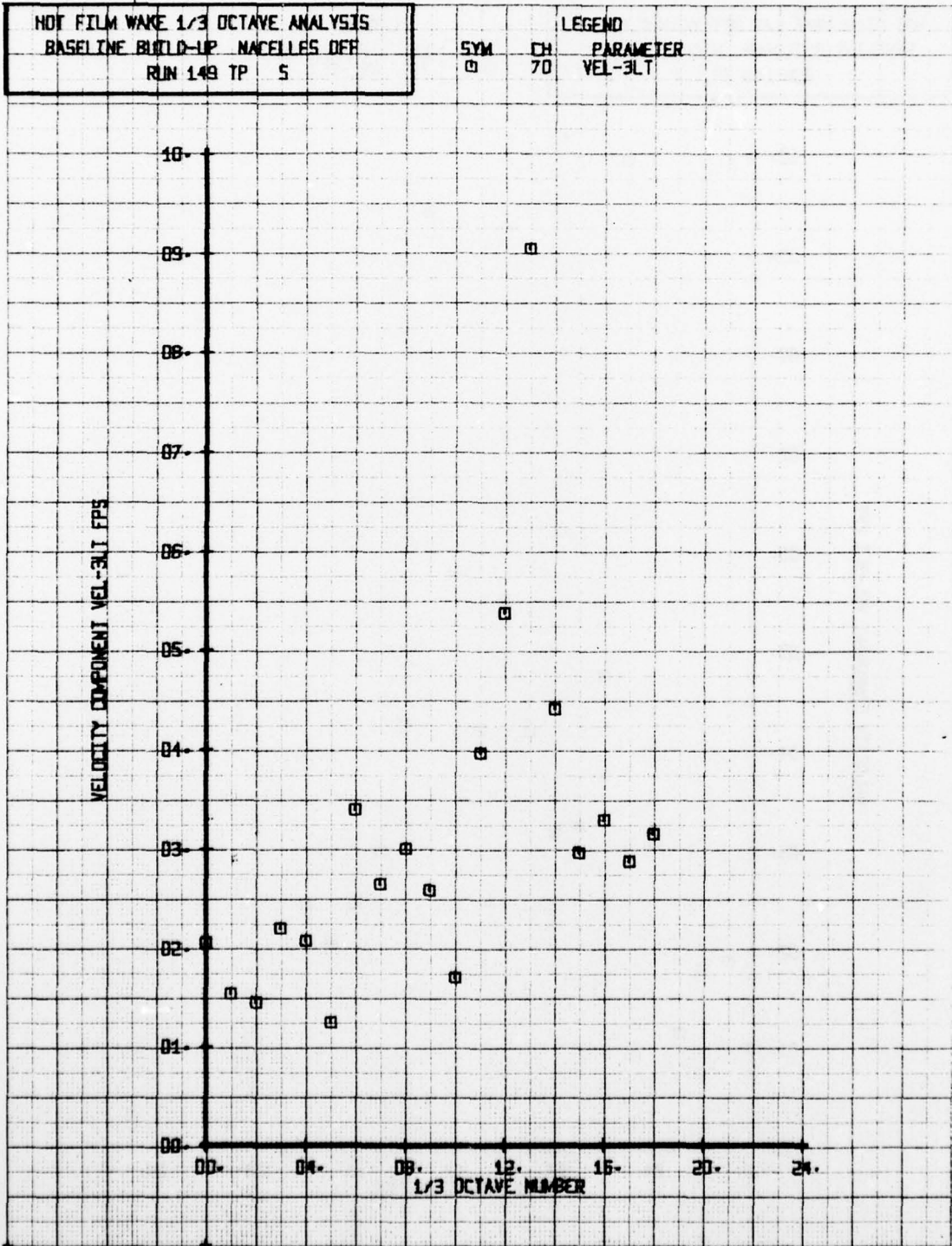


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP MACELLES DEF
 RUN 149 TP 5

SYM
 □

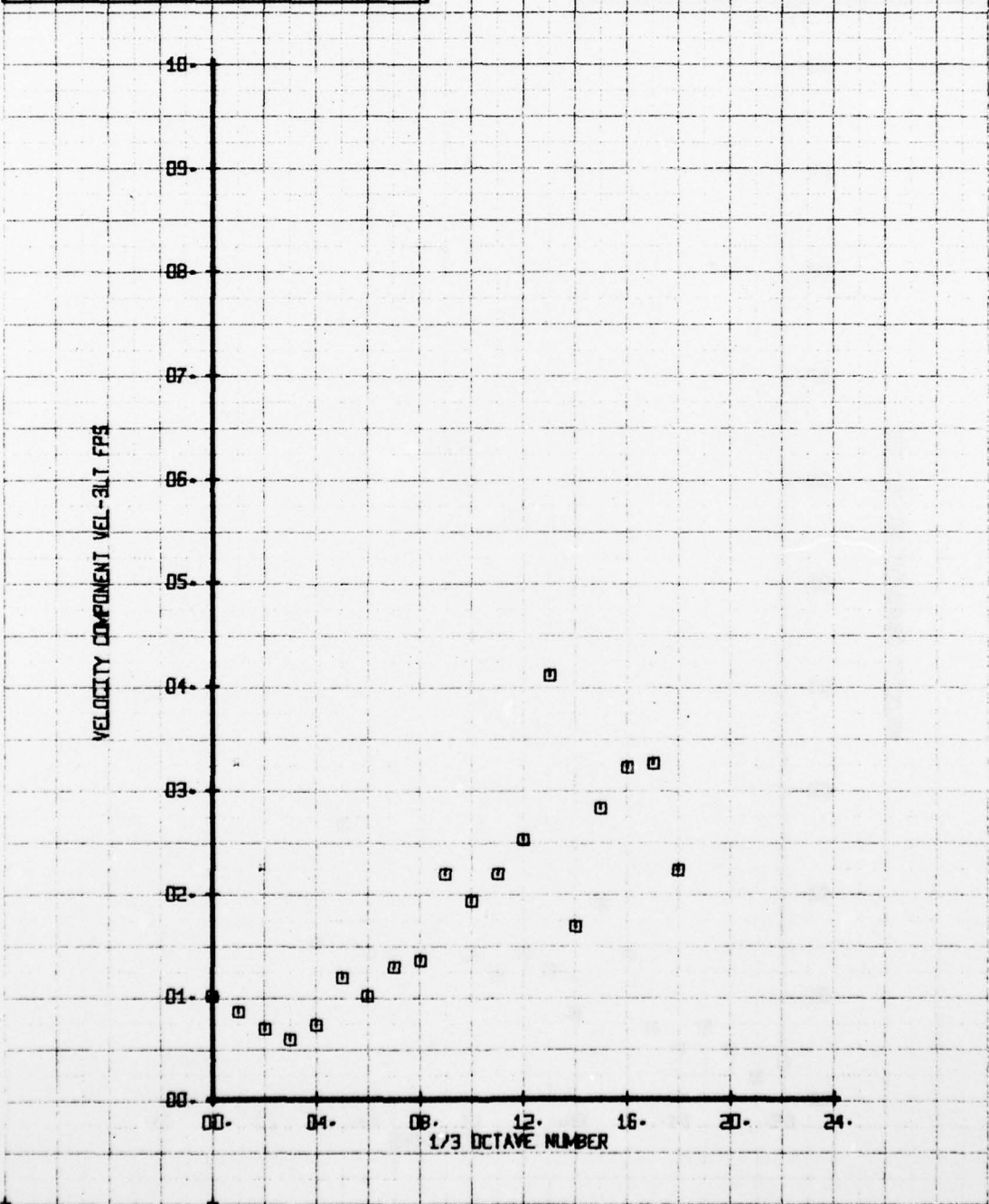
CH
 70

LEGEND
 PARAMETER
 VEL-3LT



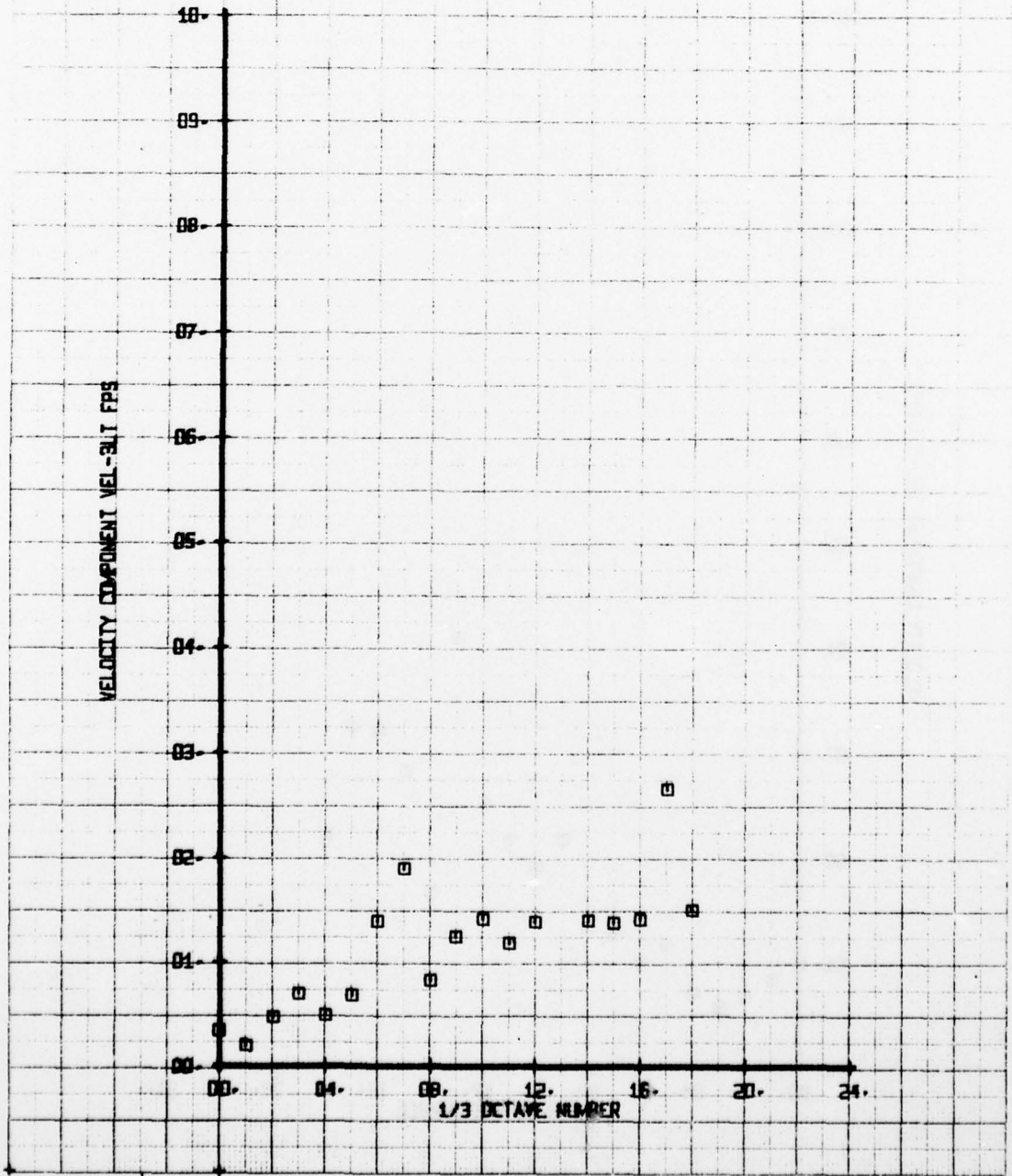
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLE5 DFF
 RUN 149 TP 6

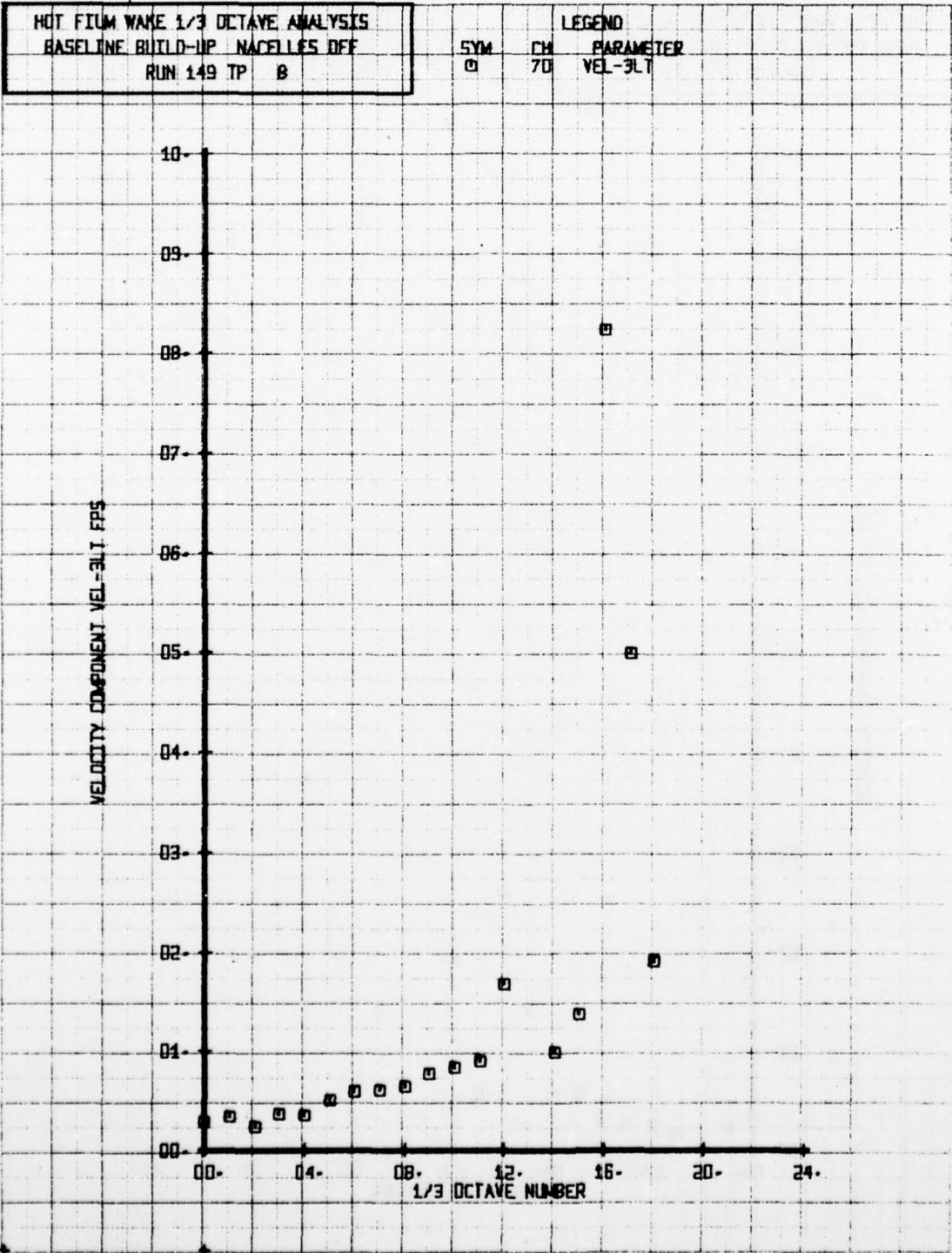
SYN CH PARAMETER
 0 70 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP MACELLES OFF
 RUN 149 TP 7

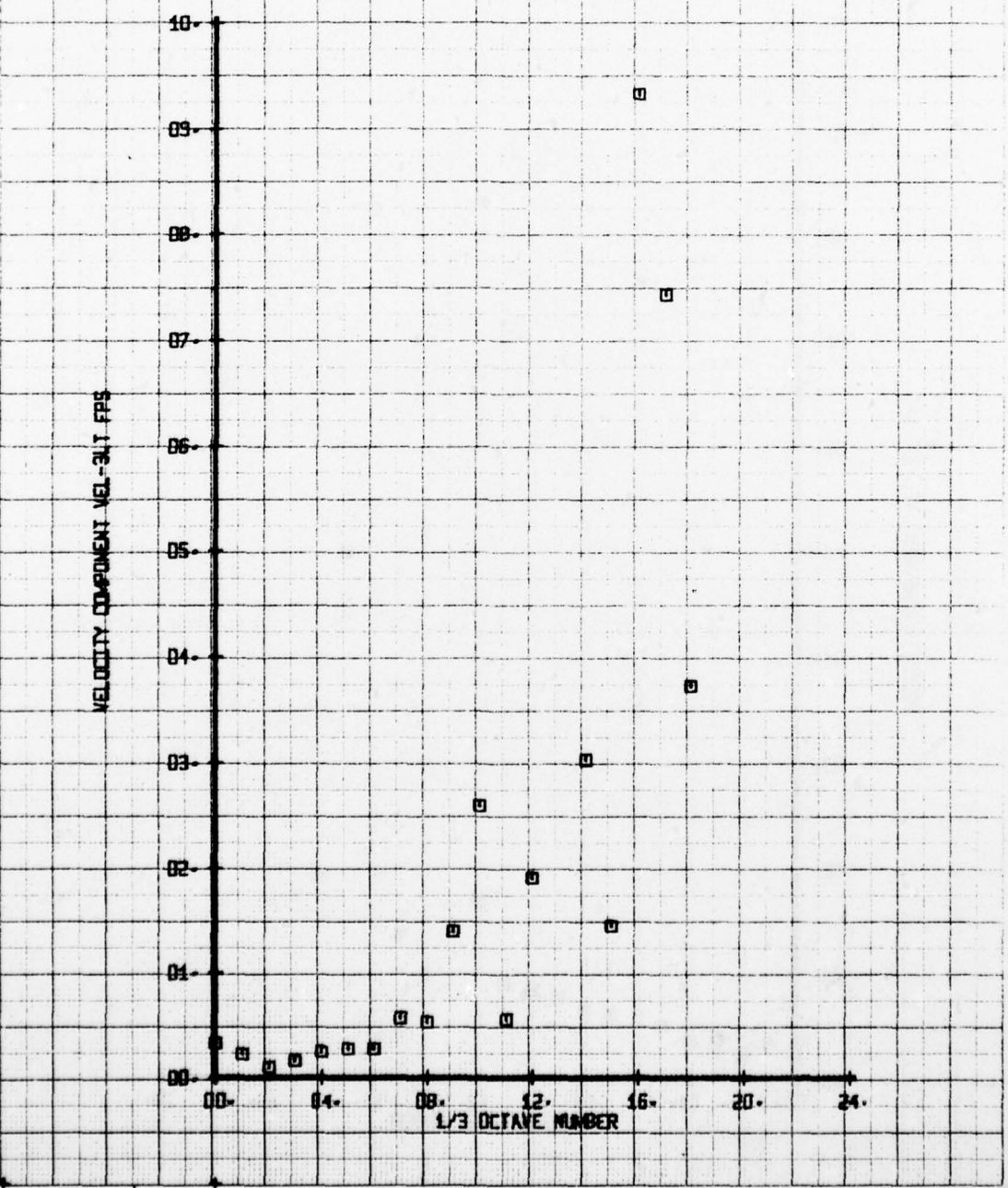
LEGEND		
SYM	CH	PARAMETER
□	70	VEL-3LT





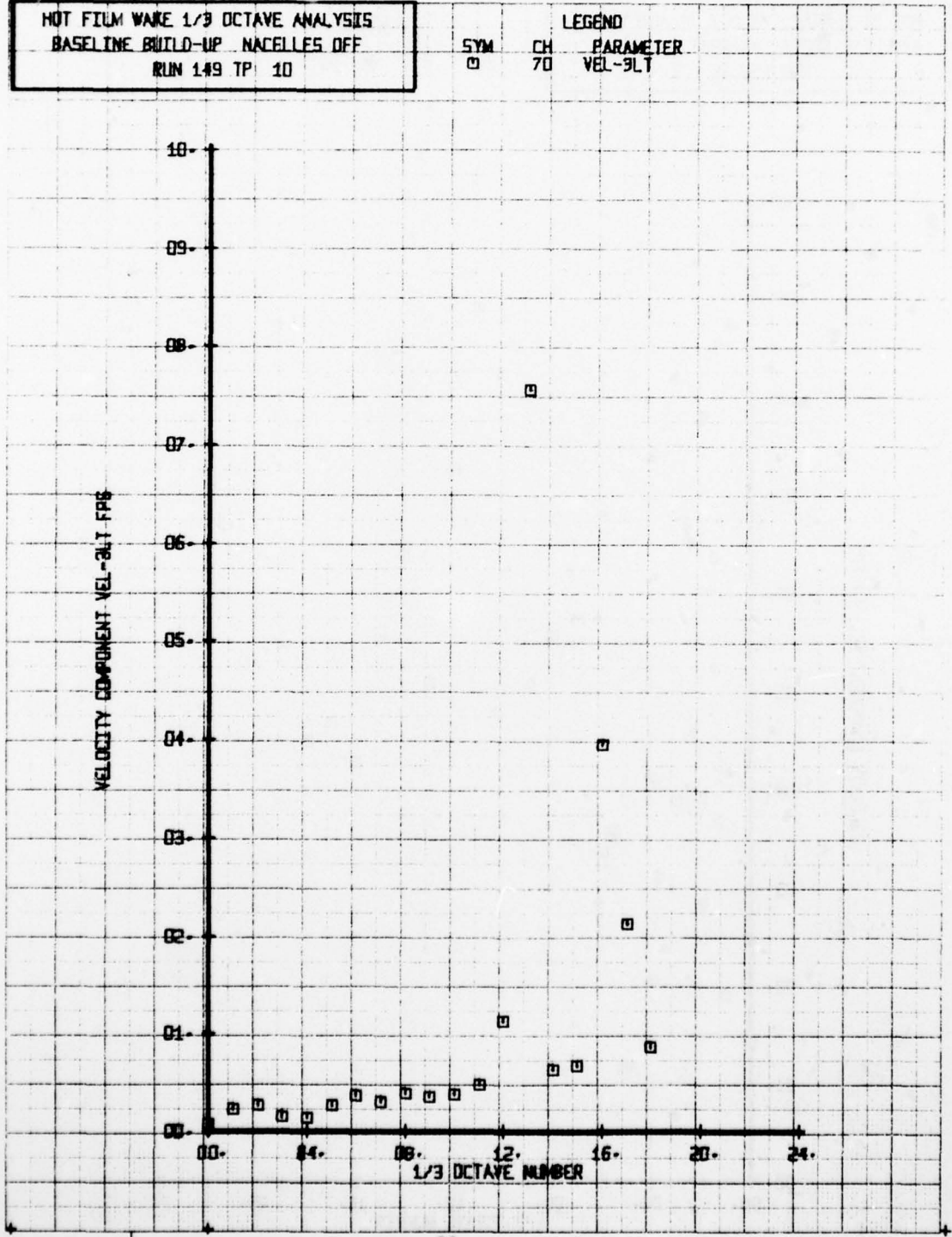
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 9

SYM	CH	LEGEND	PARAMETER
□	70		VEL-3LT



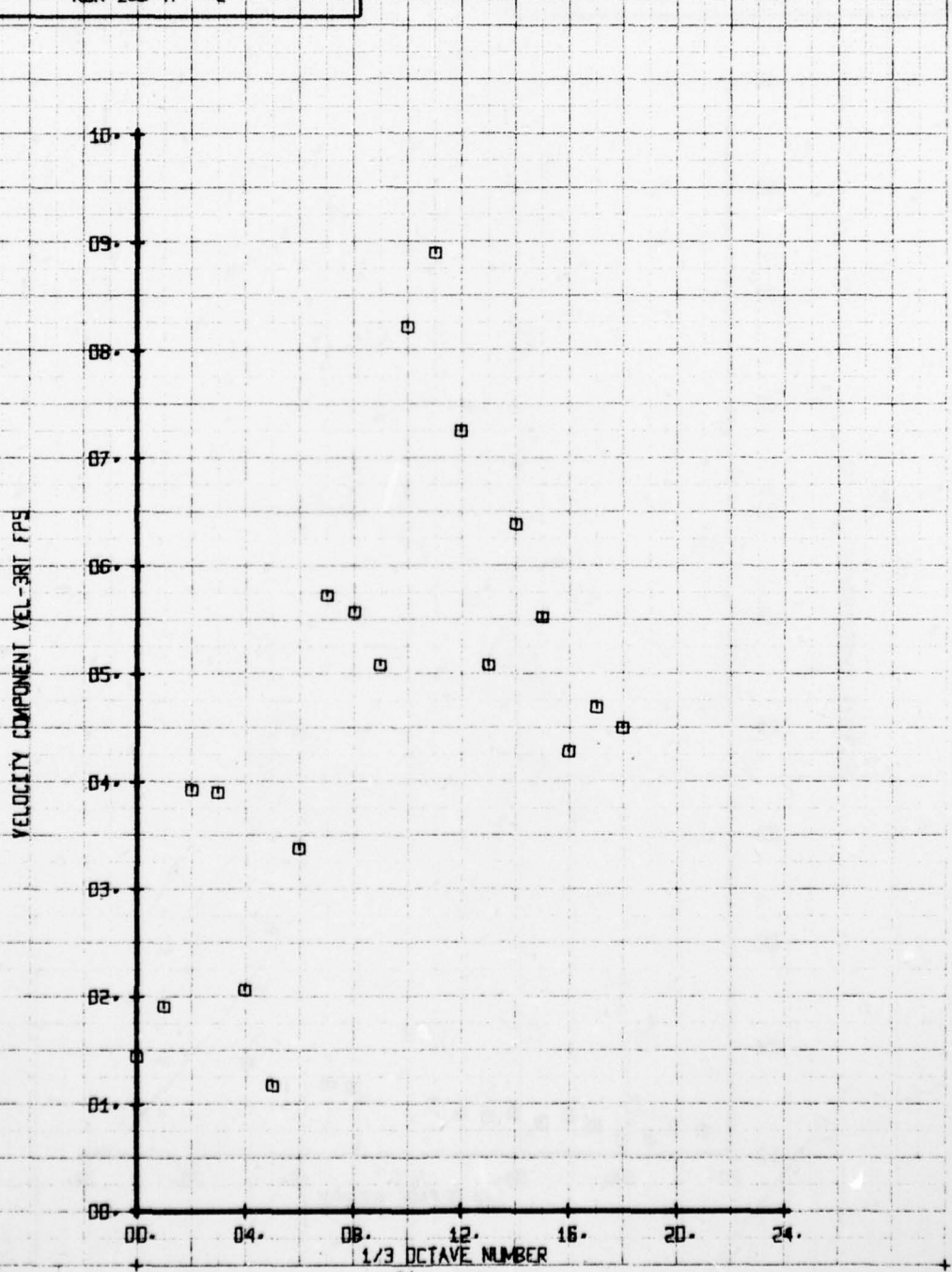
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BUILD-UP NACELLES OFF
 RUN 149 TP 10

SYM	CH	PARAMETER
□	70	VEL-3LT



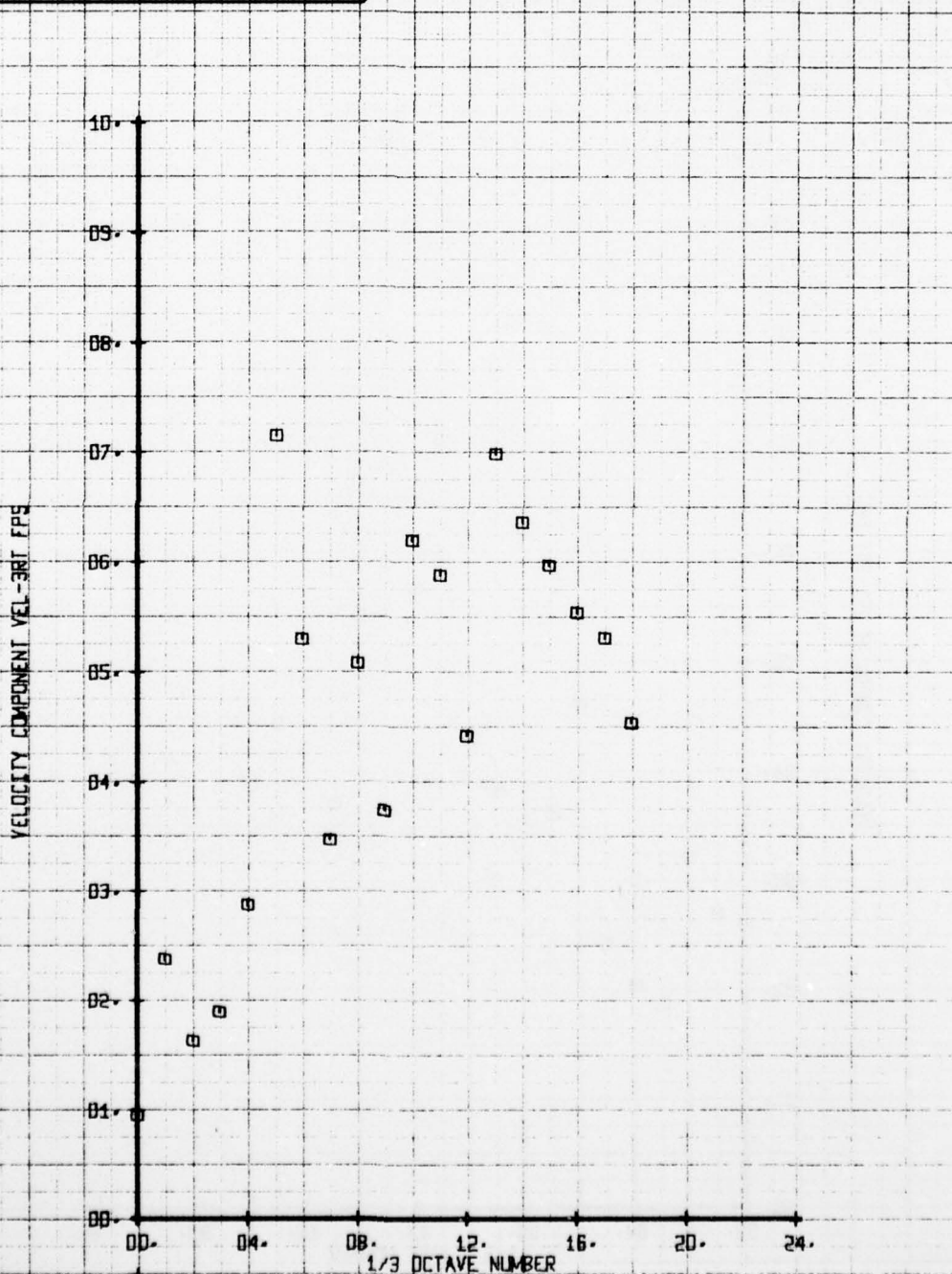
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60KTI
RUN 150 TP 2

SYM CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 3

SYM CH PARAMETER
□ 71 VEL-3RT



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BOEING VERTOL CO PHILADELPHIA PA

F/G 1/3

INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)

SEP 78 P F SHERIDAN

DAAJ02-77-C-0020

UNCLASSIFIED

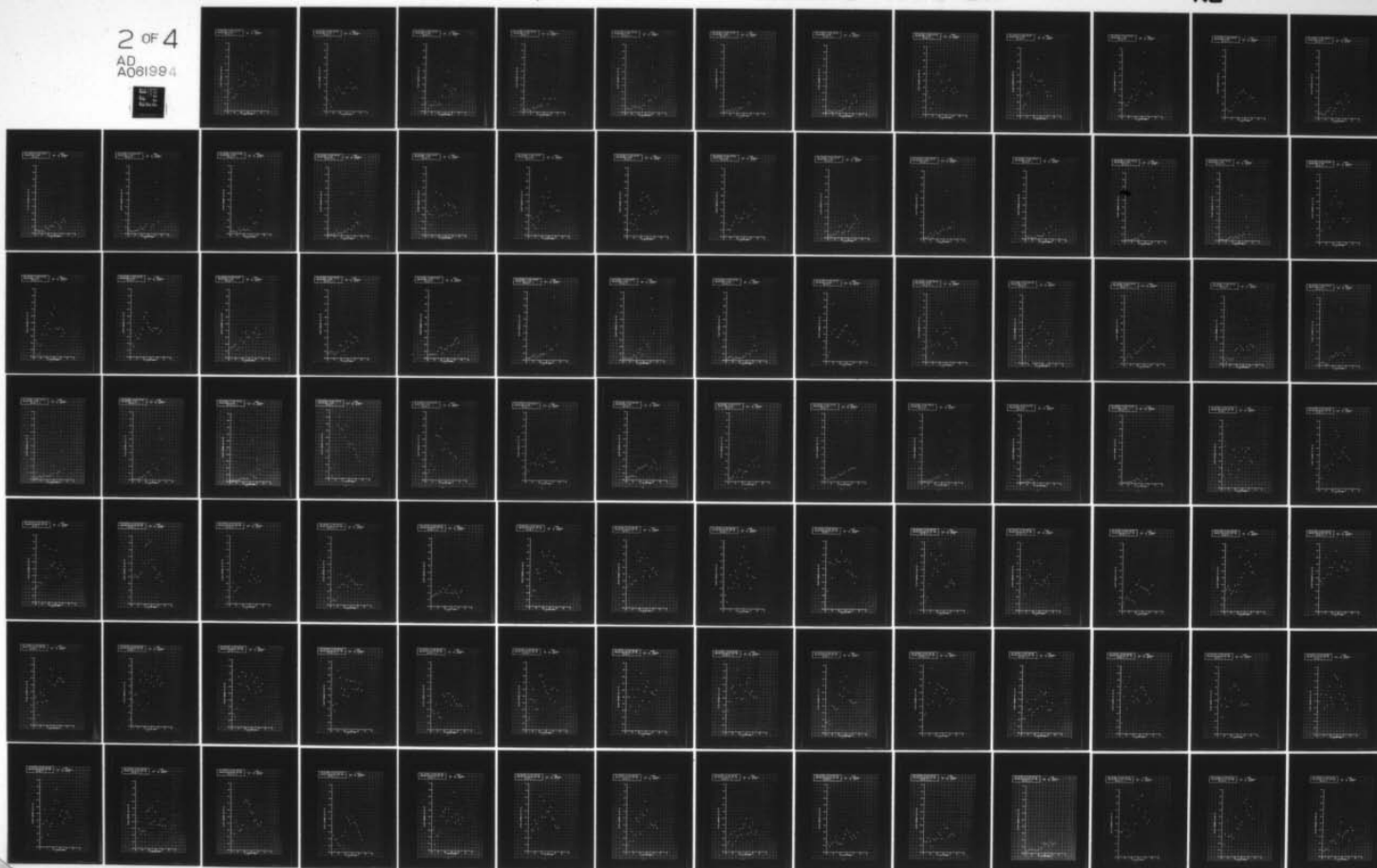
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2 of 4

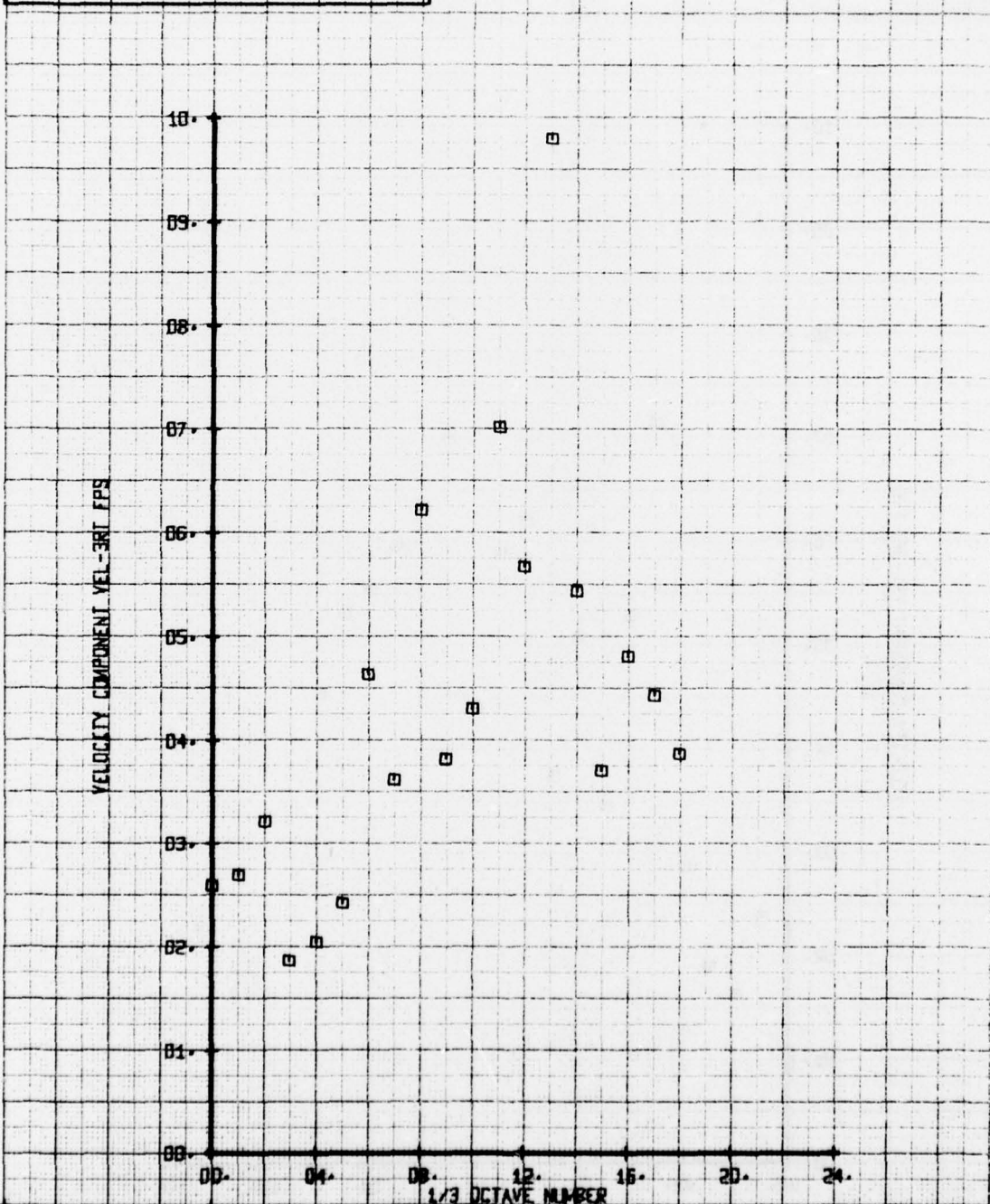
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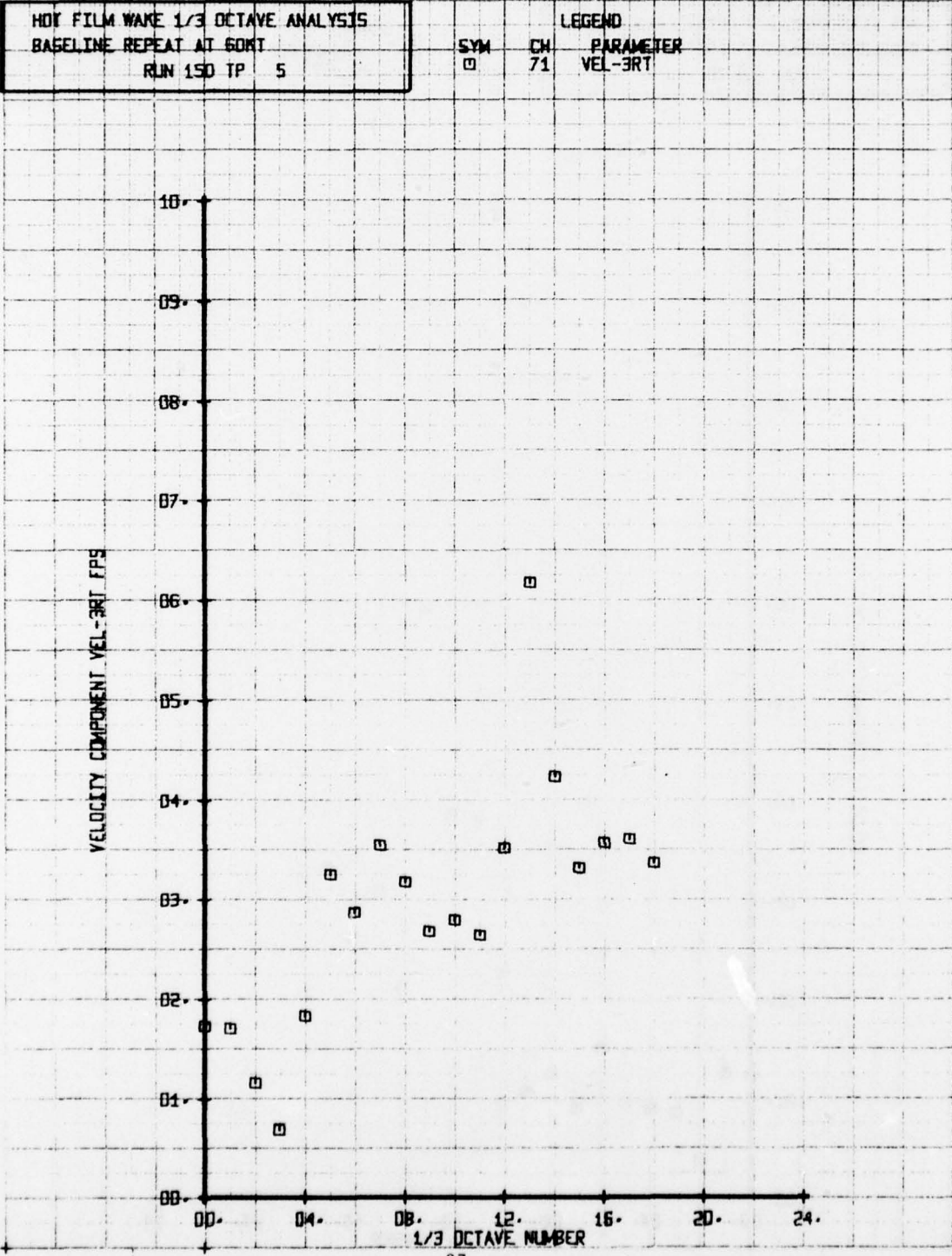
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 4

LEGEND
SYM CH PARAMETER
□ 71 VEL-3RT



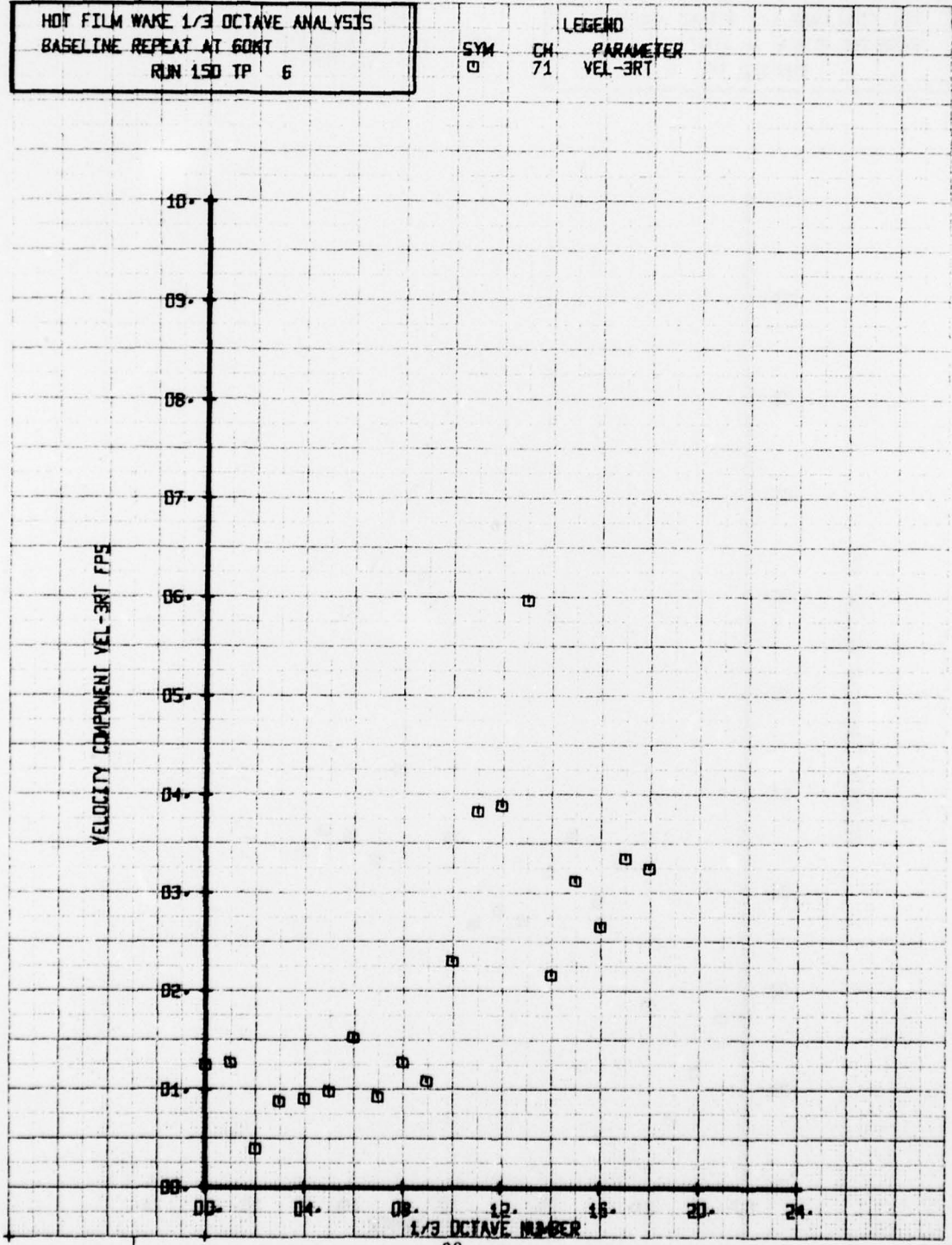
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 BASELINE REPEAT AT 60RT
 RUN 150 TP 5

SYM	CH	PARAMETER
□	71	VEL-3RT



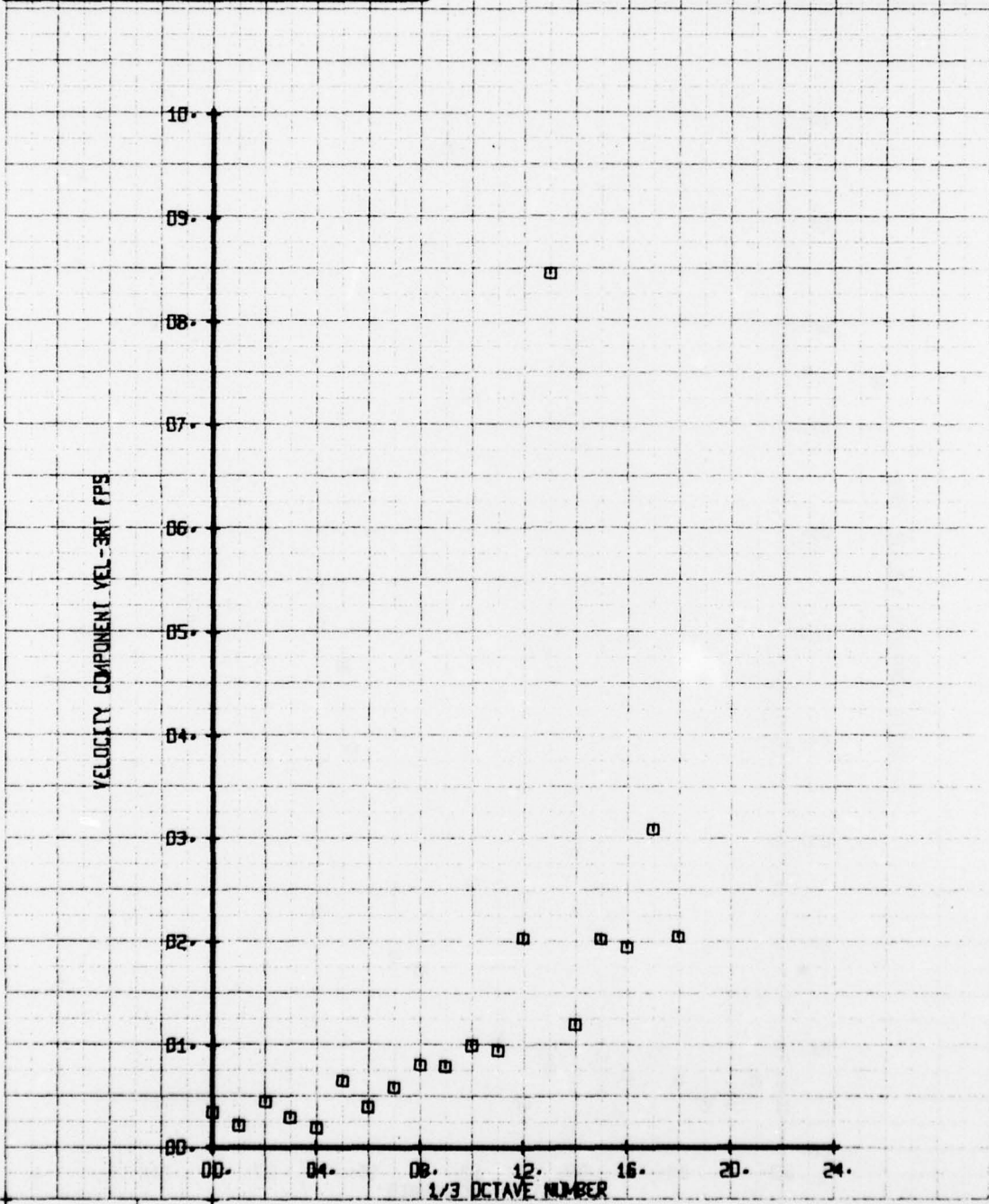
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 6

SYM	CH	PARAMETER
□	71	VEL-3RT



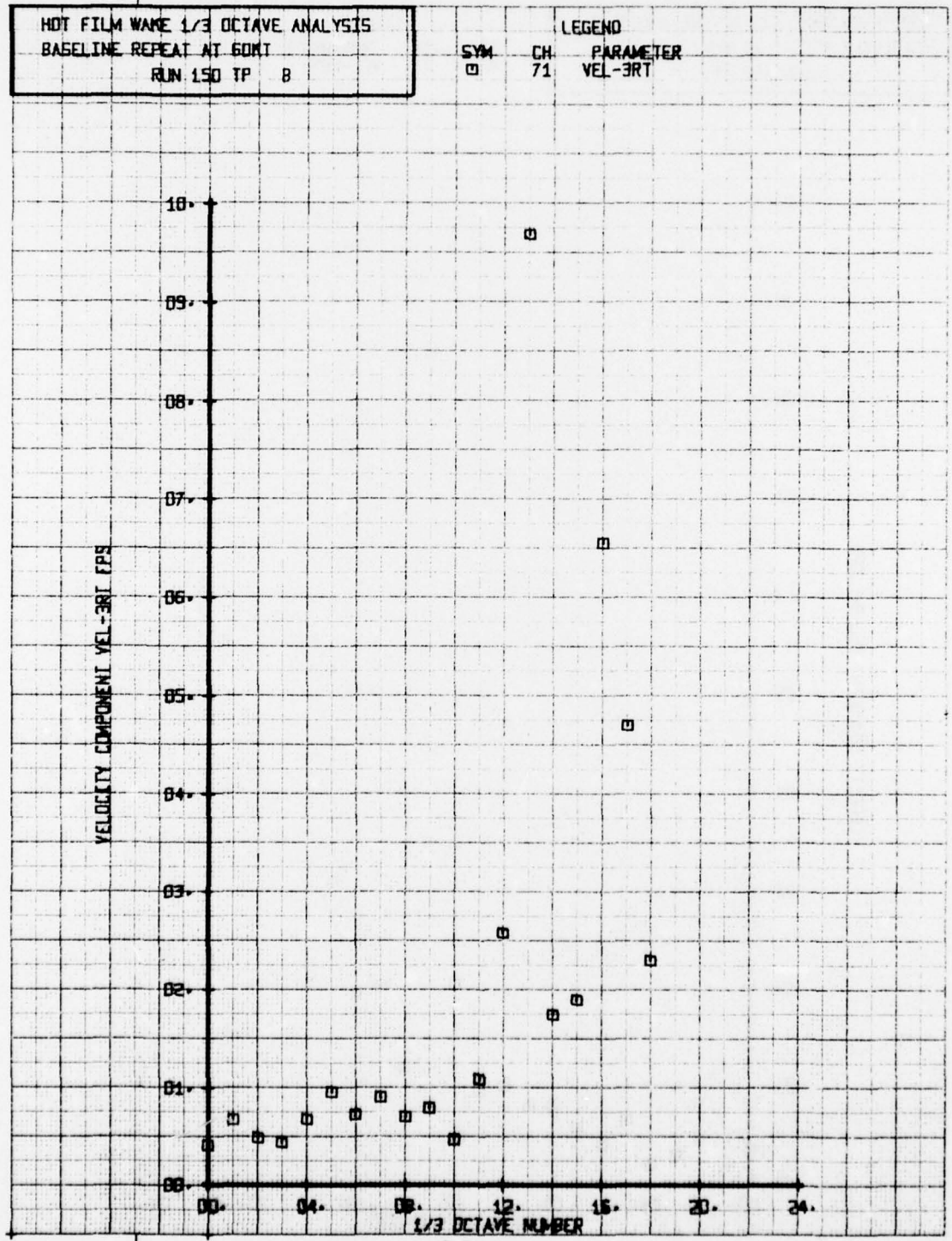
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 7

SYM	CH	PARAMETER
□	71	VEL-3RT



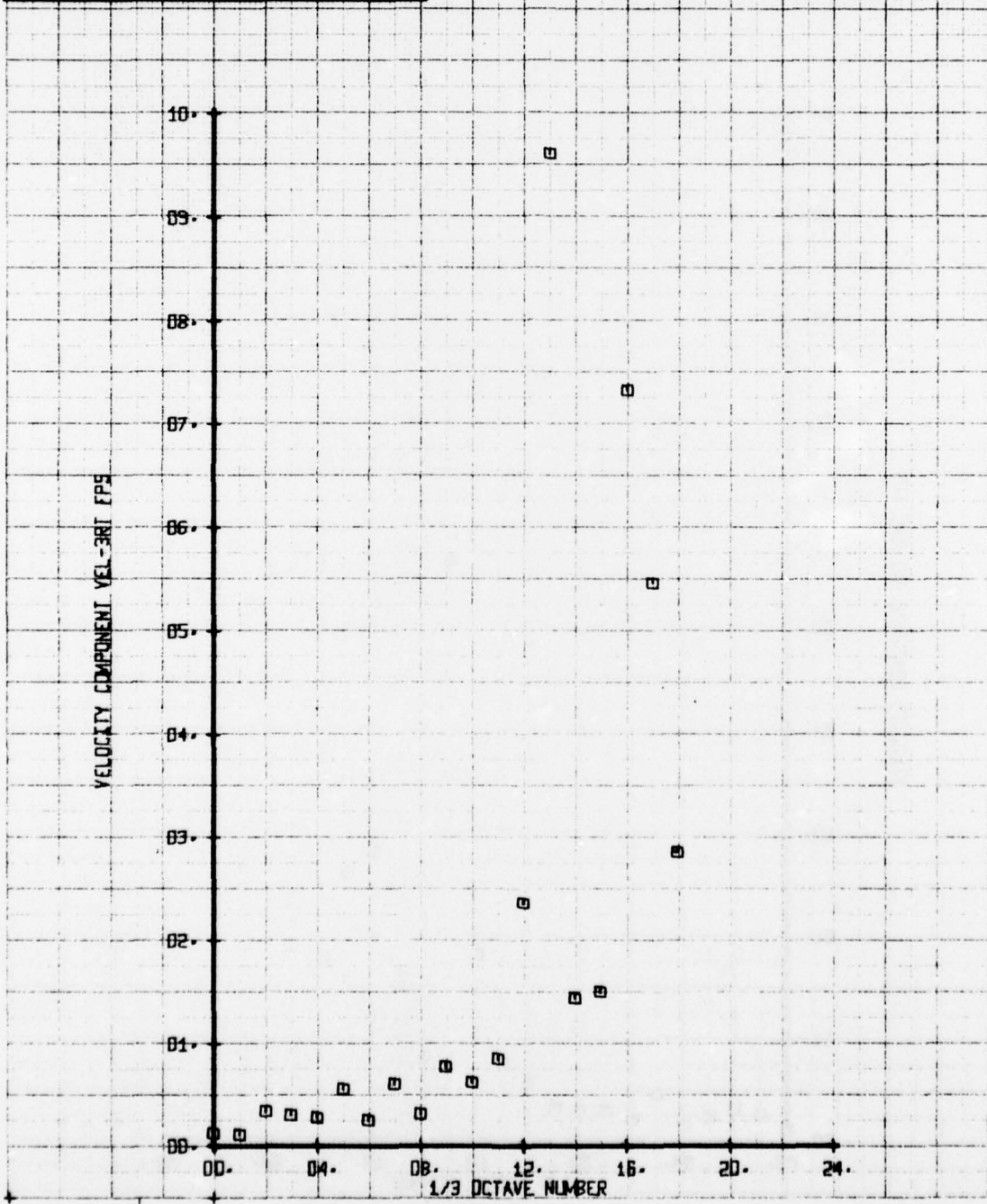
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP B

LEGEND
SYM CH PARAMETER
□ 71 VEL-3RT



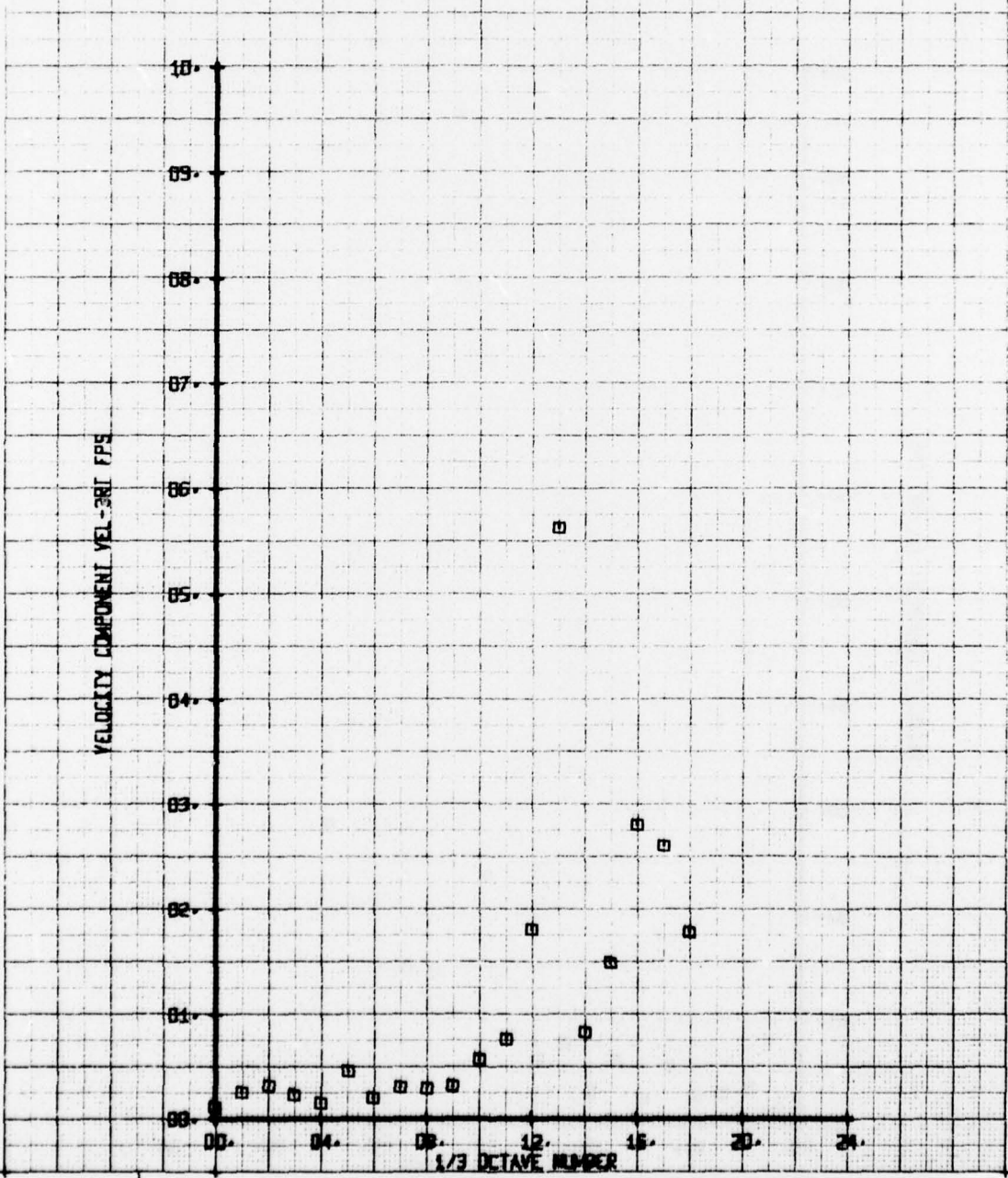
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 9

SYM	CH	LEGEND	PARAMETER
□	71		VEL-3RT



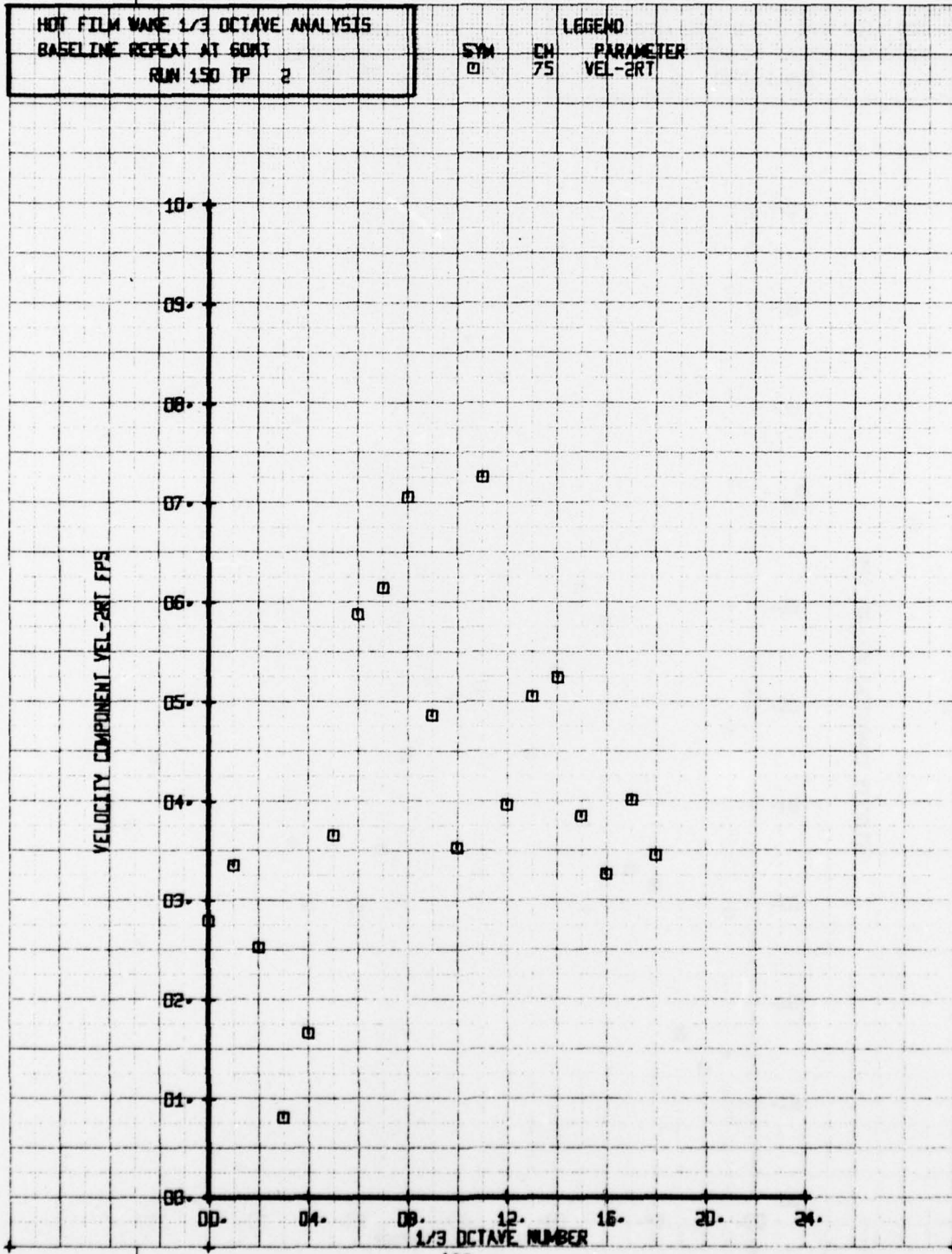
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 10

SYM	CH	PARAMETER
□	71	VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 2

SYN CH PARAMETER
□ 75 VEL-2RT

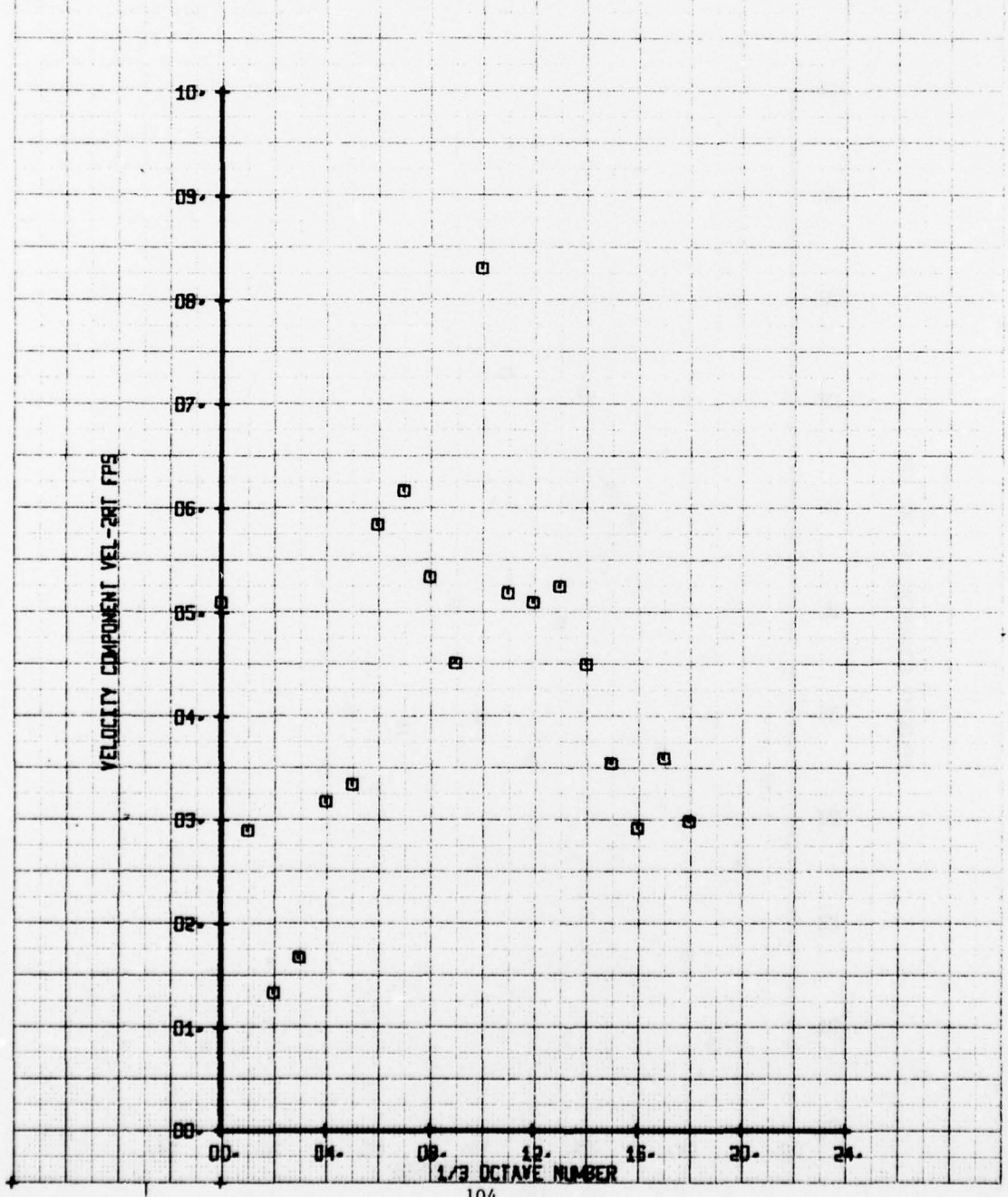


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 1SD TP 3

SYM
 □

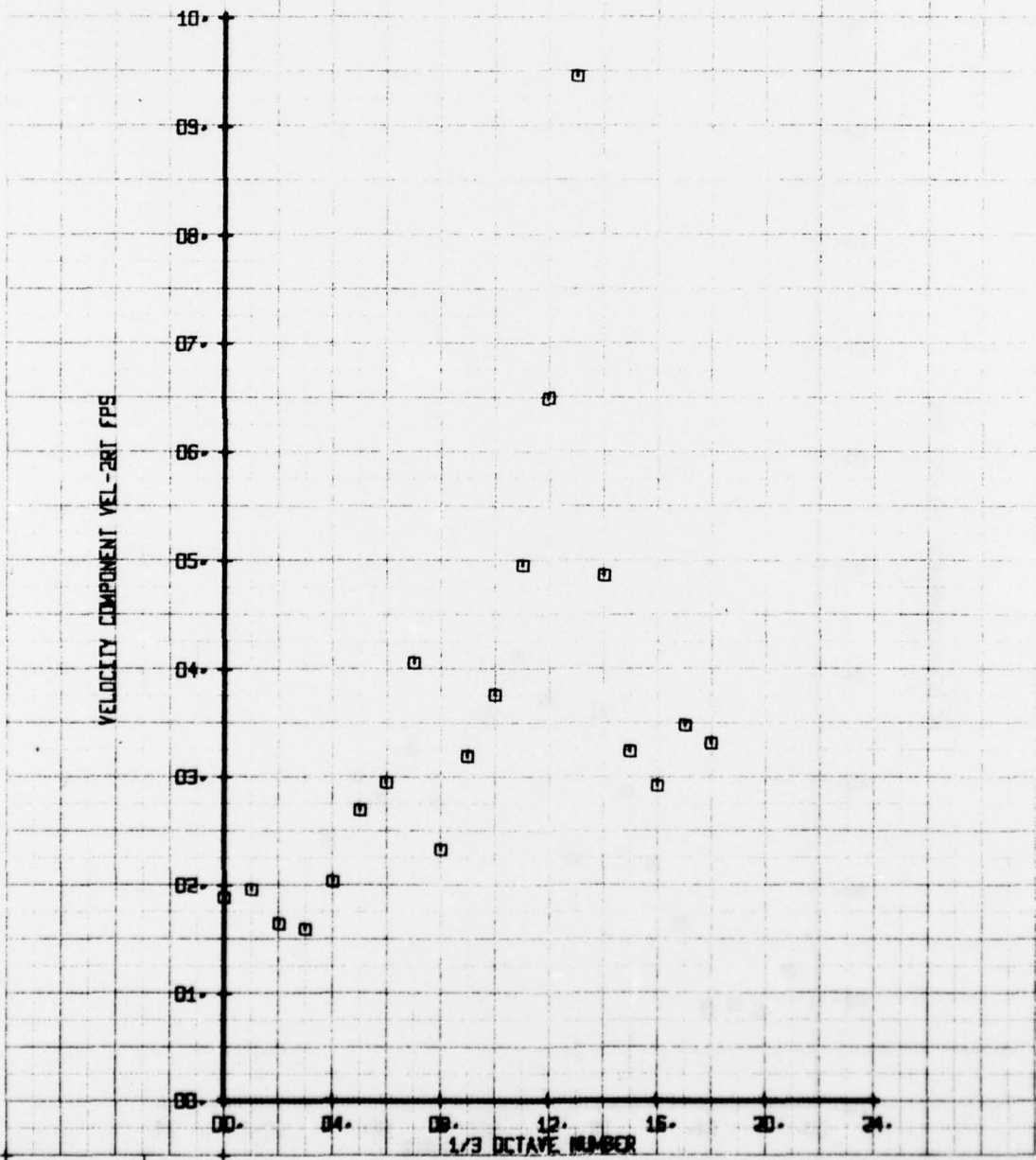
CH
 75

LEGEND
 PARAMETER
 VEL-2RT



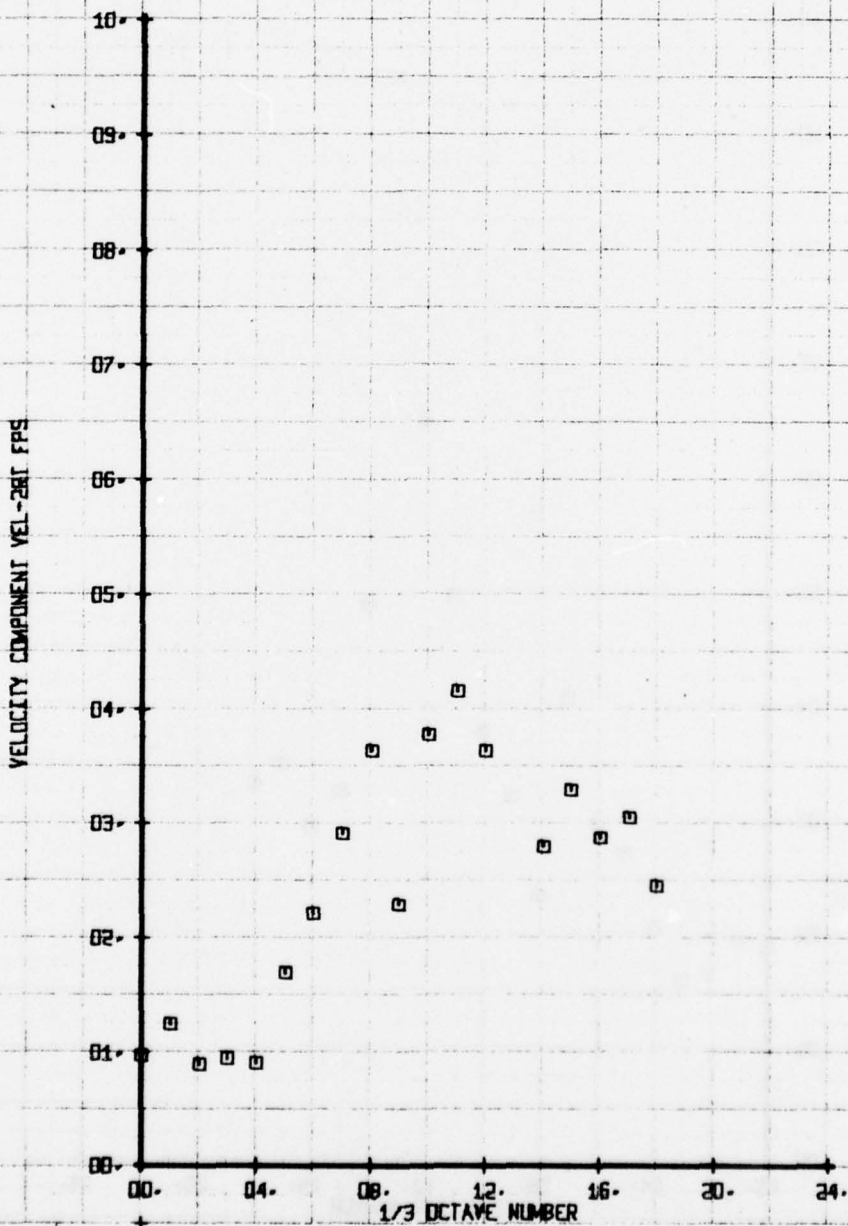
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 4

LEGEND
 SYM CH PARAMETER
 □ 75 VEL-2RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 5

SYM CH PARAMETER
□ 75 VEL-2RT

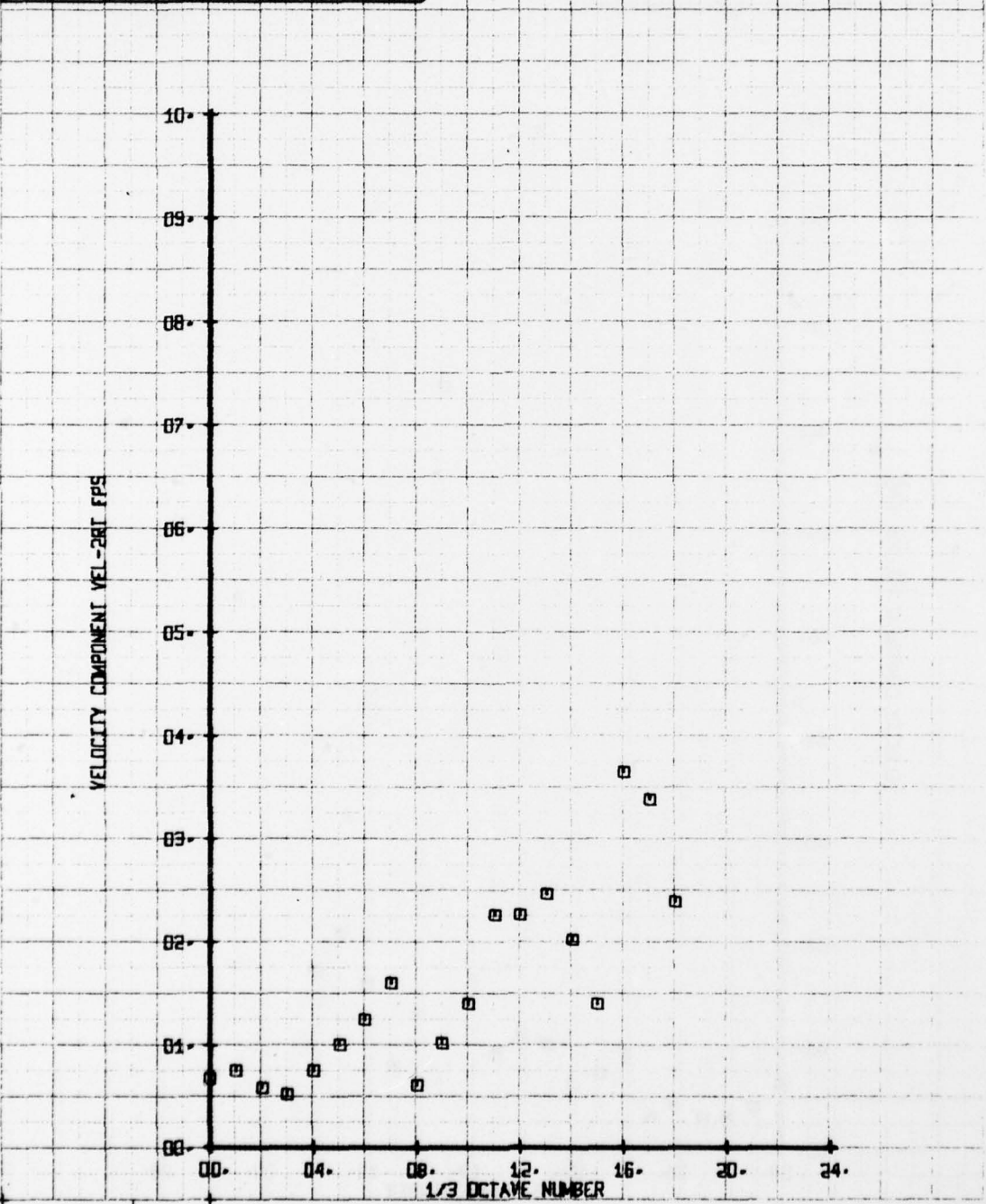


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60KT
RUN 150 TP 6

SYM
□

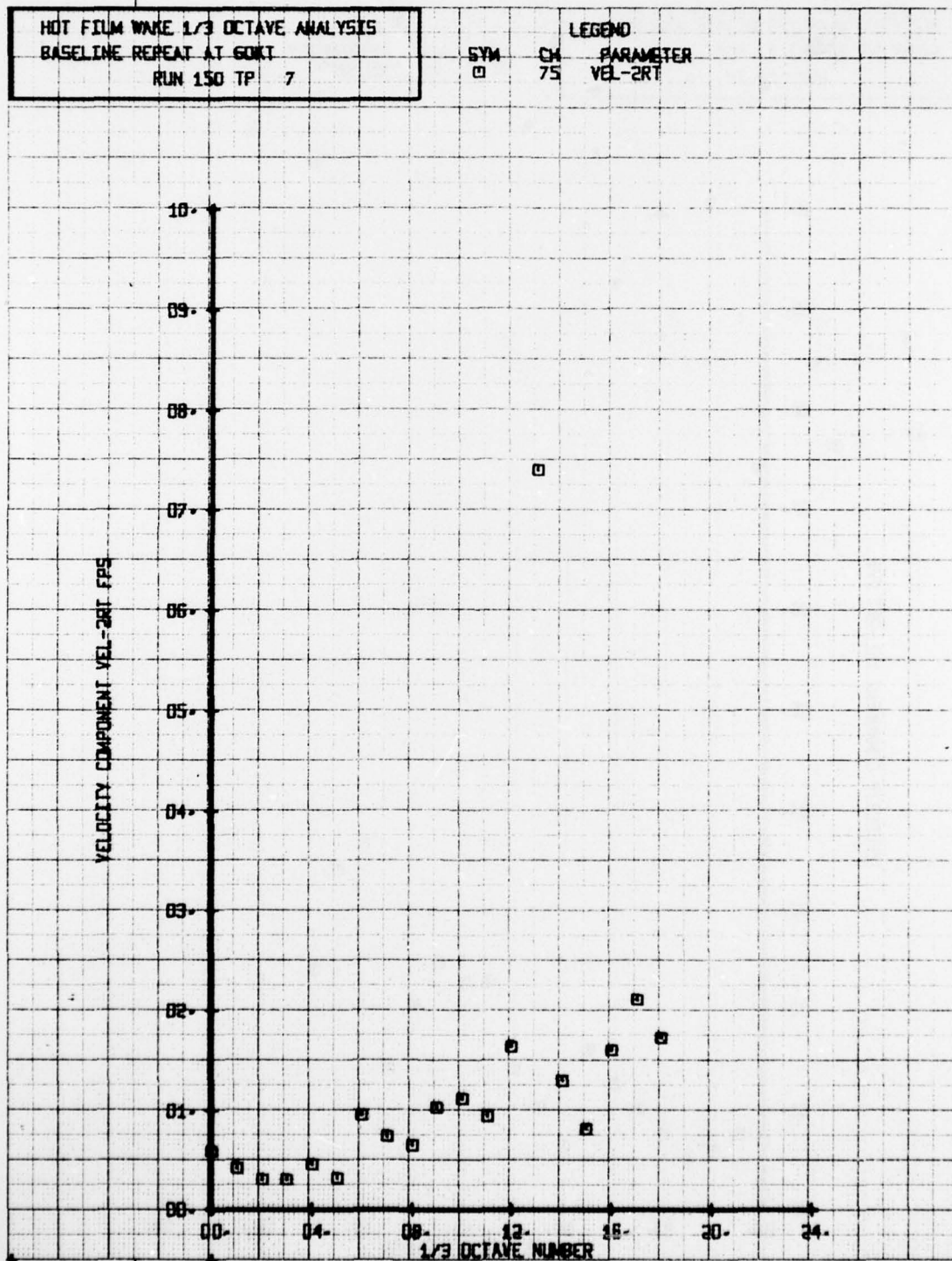
CH
75

LEGEND
PARAMETER
VEL-2RT



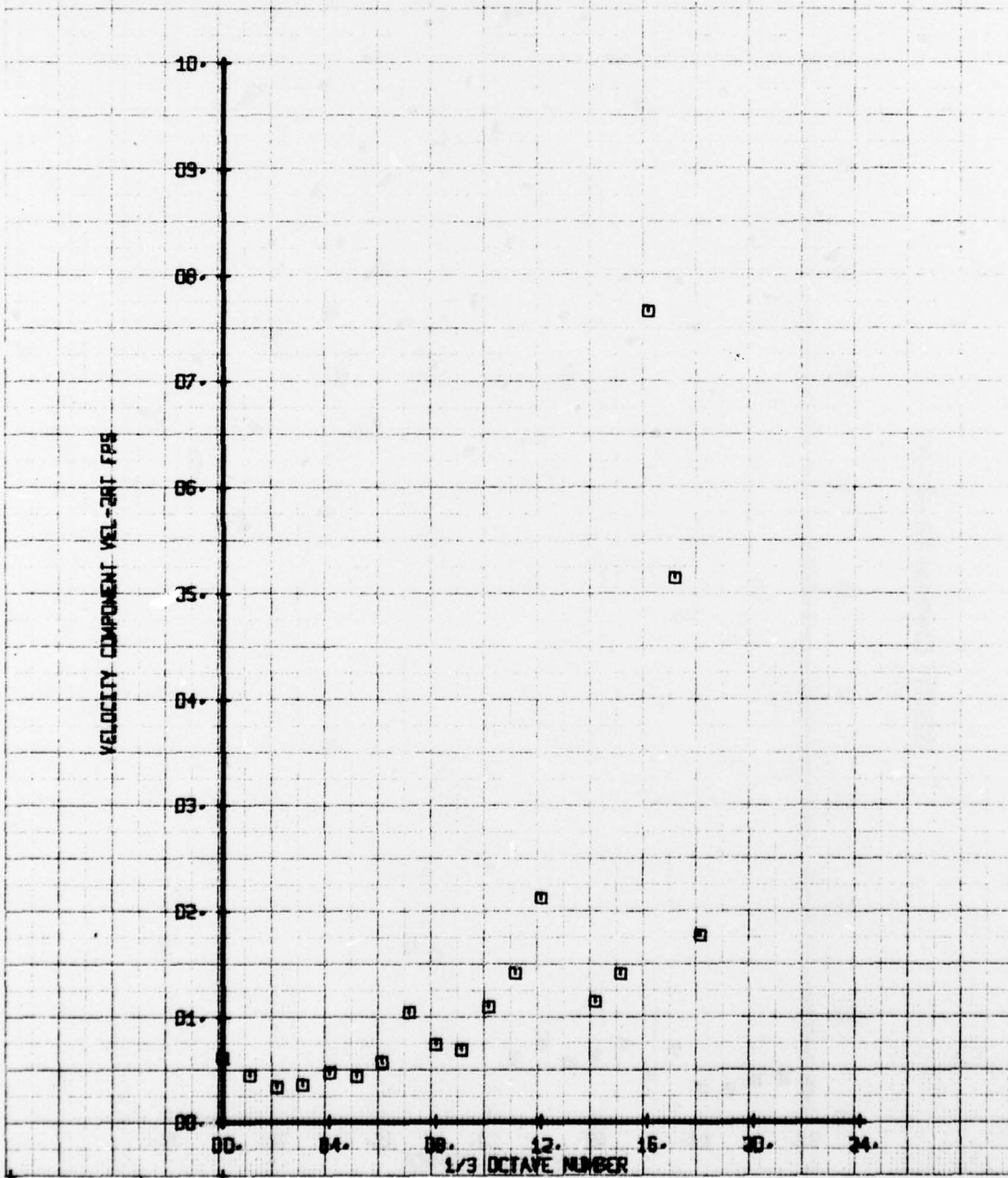
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60Kt
RUN 150 TP 7

LEGEND
SYM CH PARAMETER
□ 75 VEL-2RT



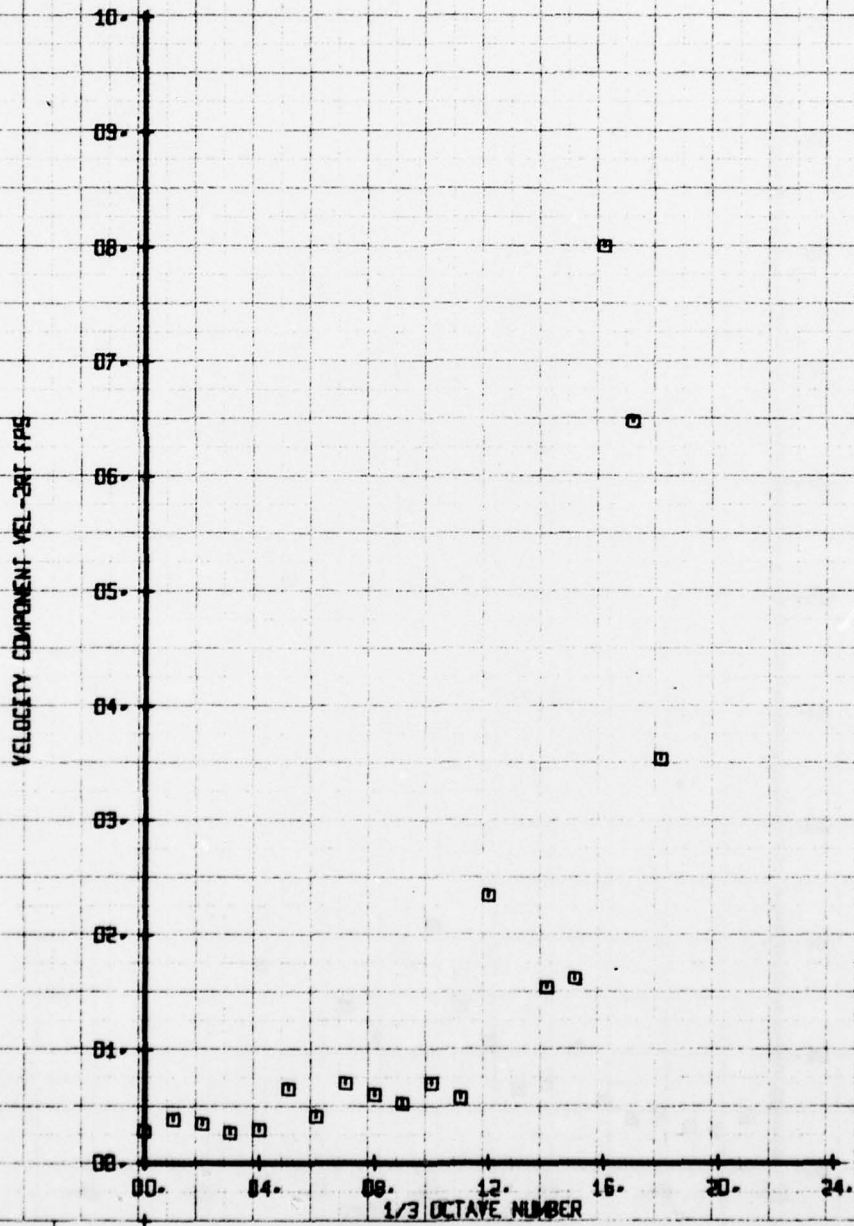
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60KT
 RUN 150 TP 8

LEGEND
 SYM CH PARAMETER
 □ 75 VEL-2RT



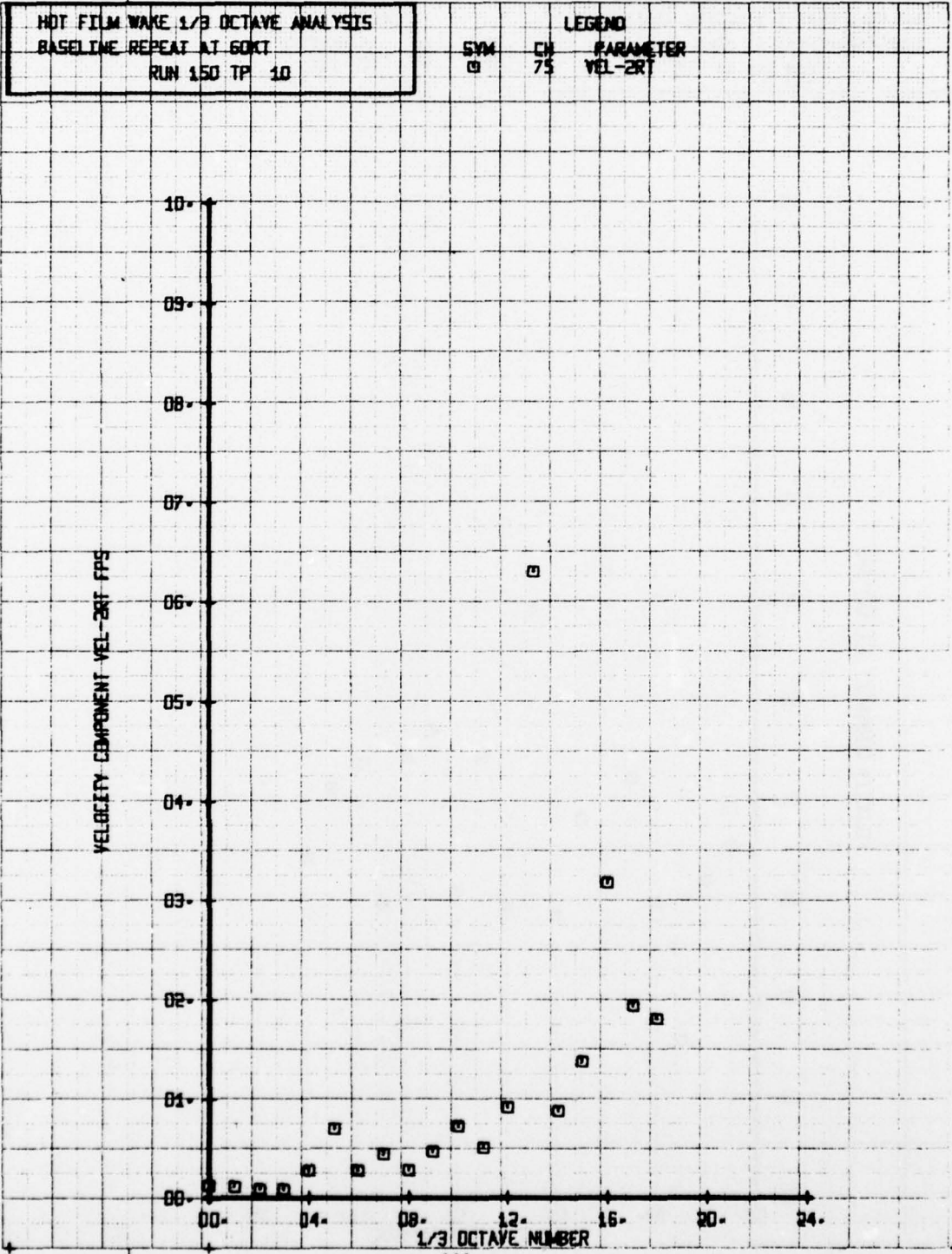
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60KT
RUN 150 TP 9

LEGEND
SYM CH PARAMETER
□ 75 VEL-2RT



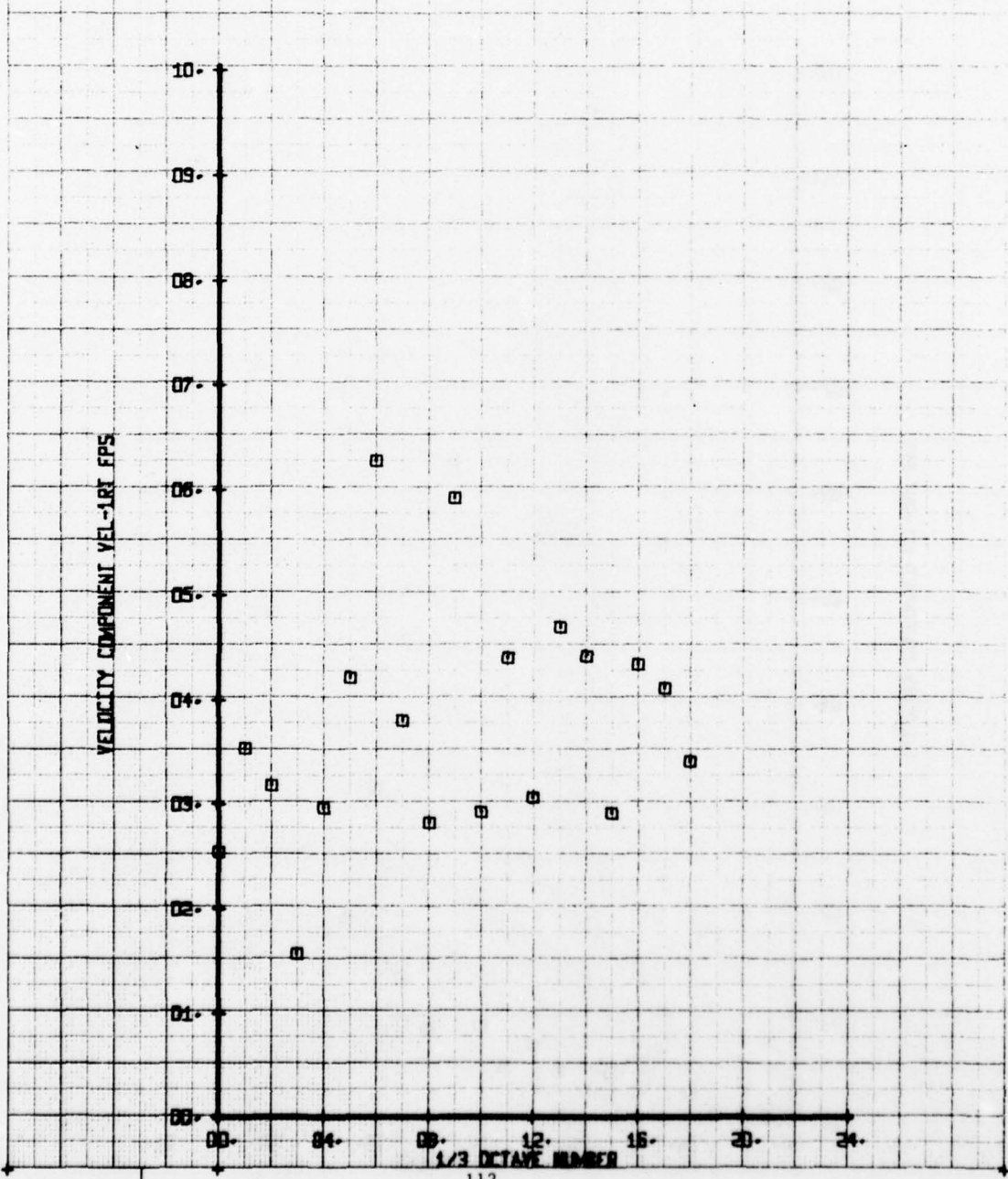
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60KT
 RUN 150 TP 10

LEGEND
 CH PARAMETER
 75 VEL-ZRT
 □



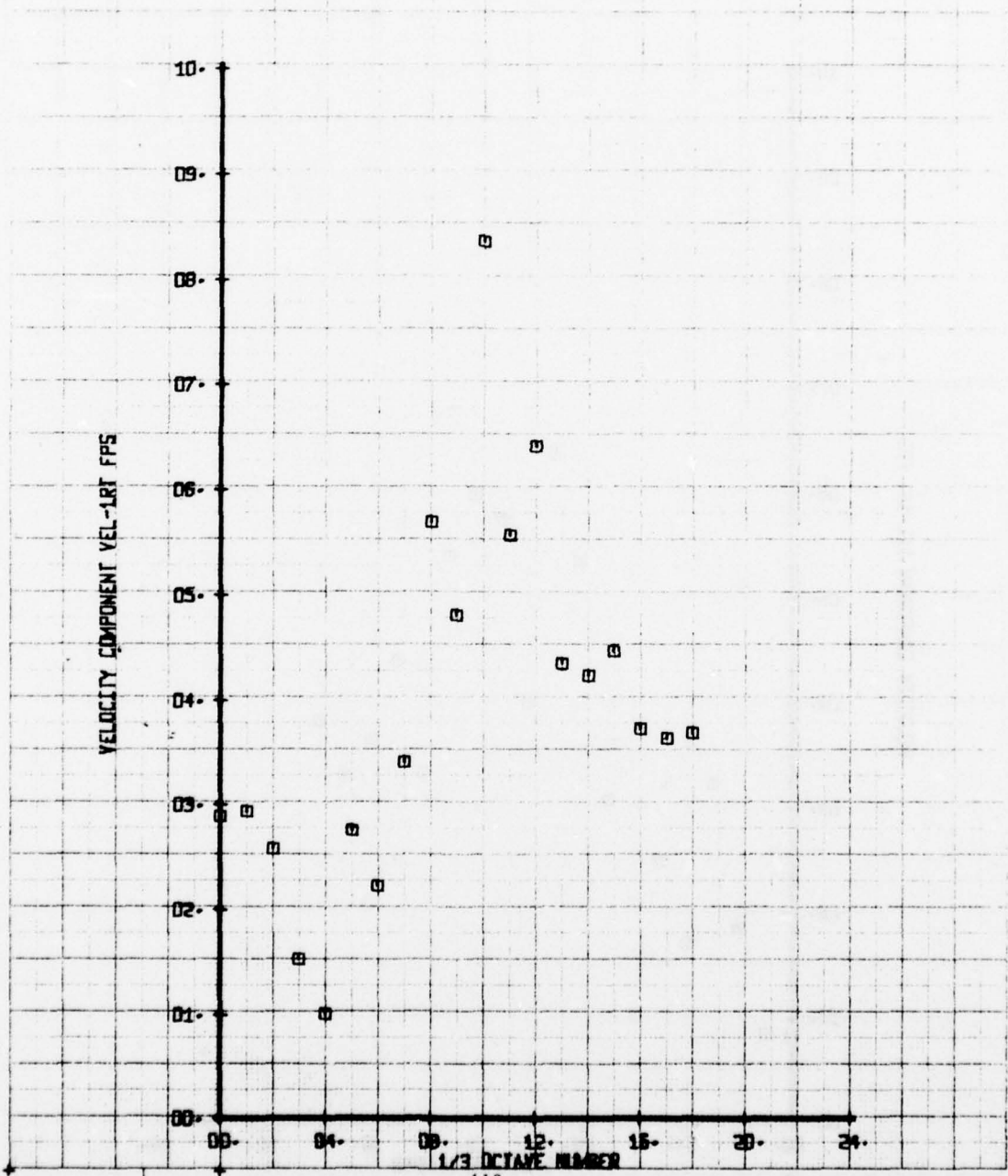
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60KFT
 RUN 150 TP 2

SYM CH PARAMETER
 □ 74 VEL-1RT



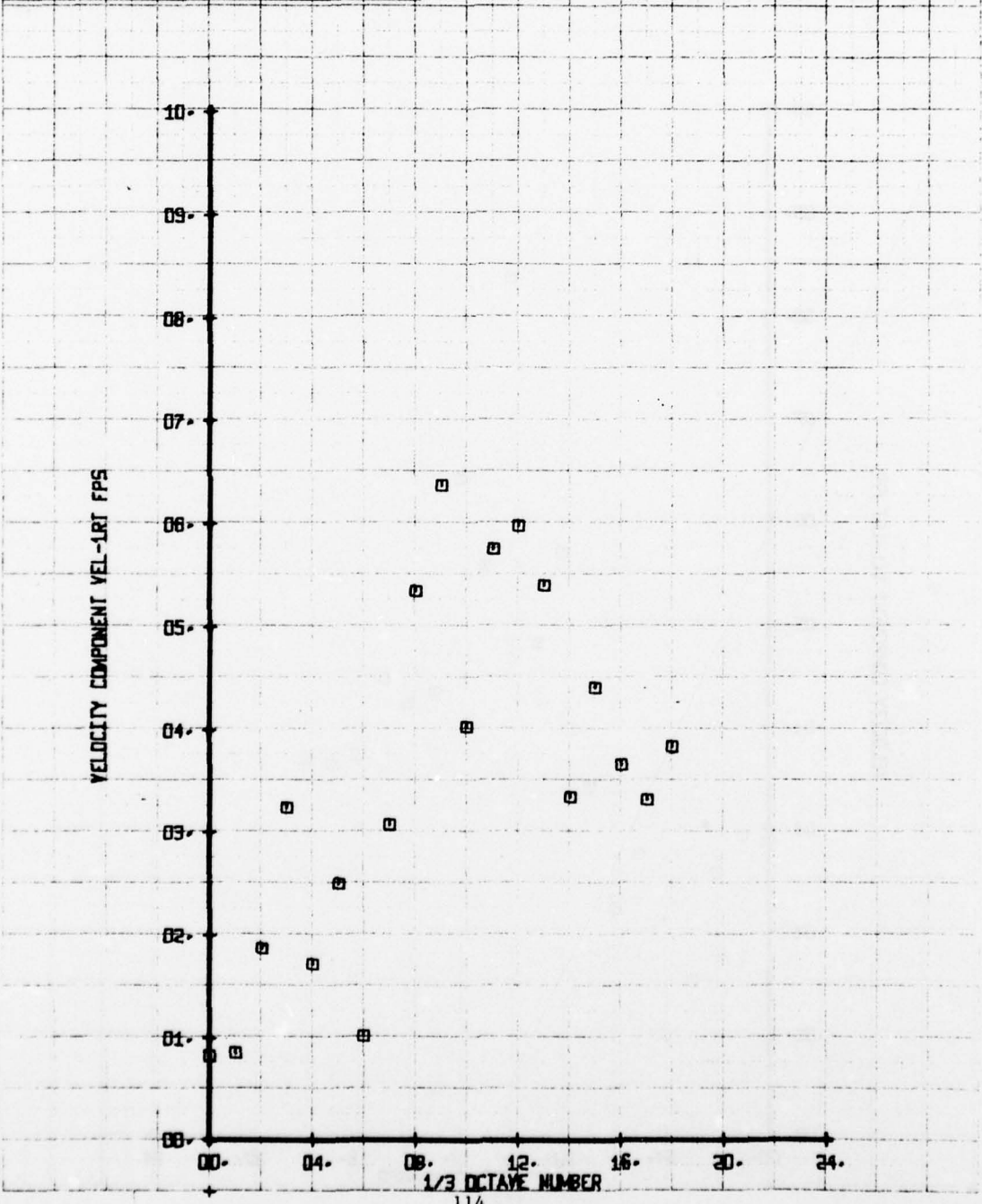
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 3

LEGEND
 SYM CH PARAMETER
 □ 74 VEL-1RT



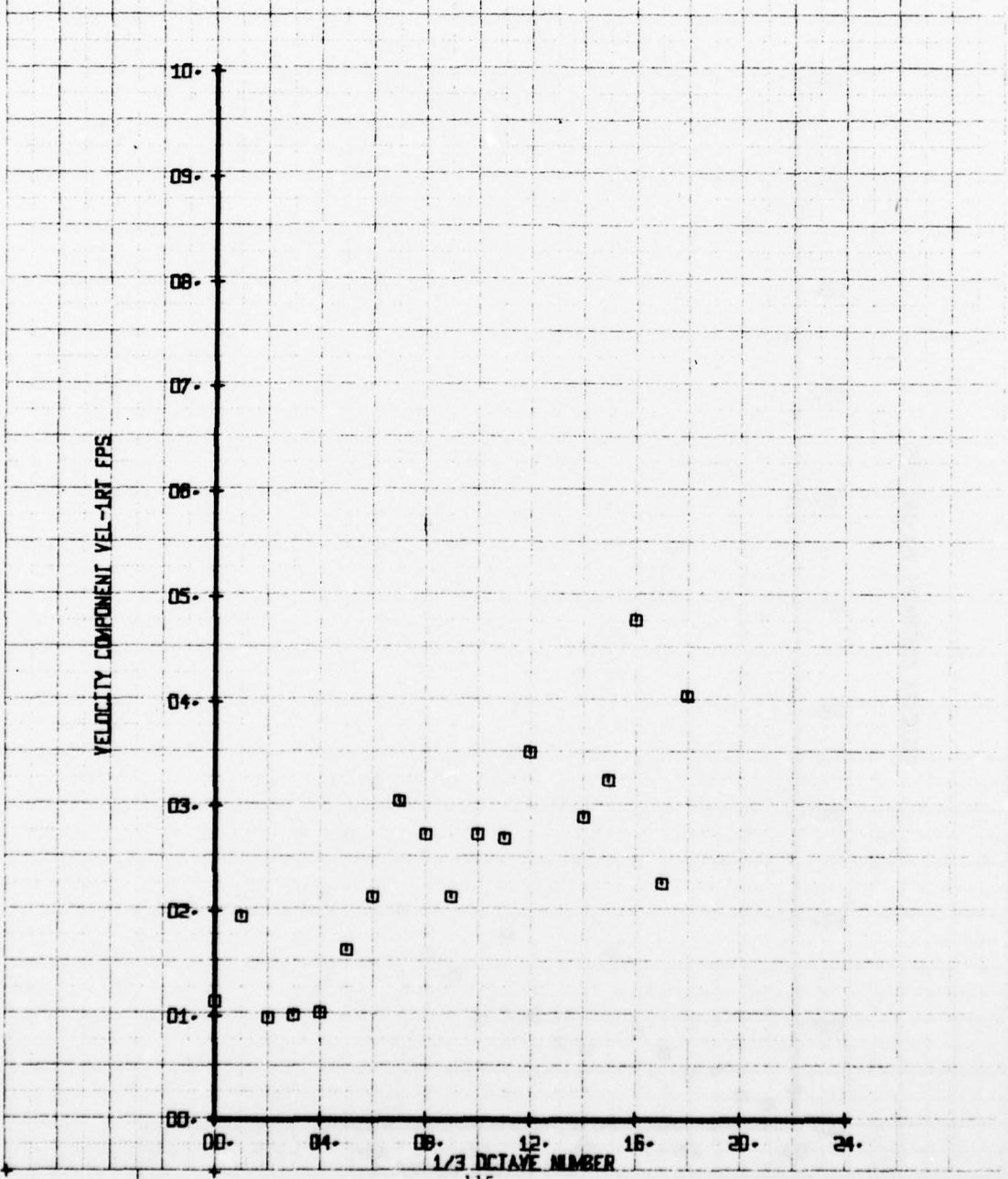
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 4

SYM CH PARAMETER
 □ 74 VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 5

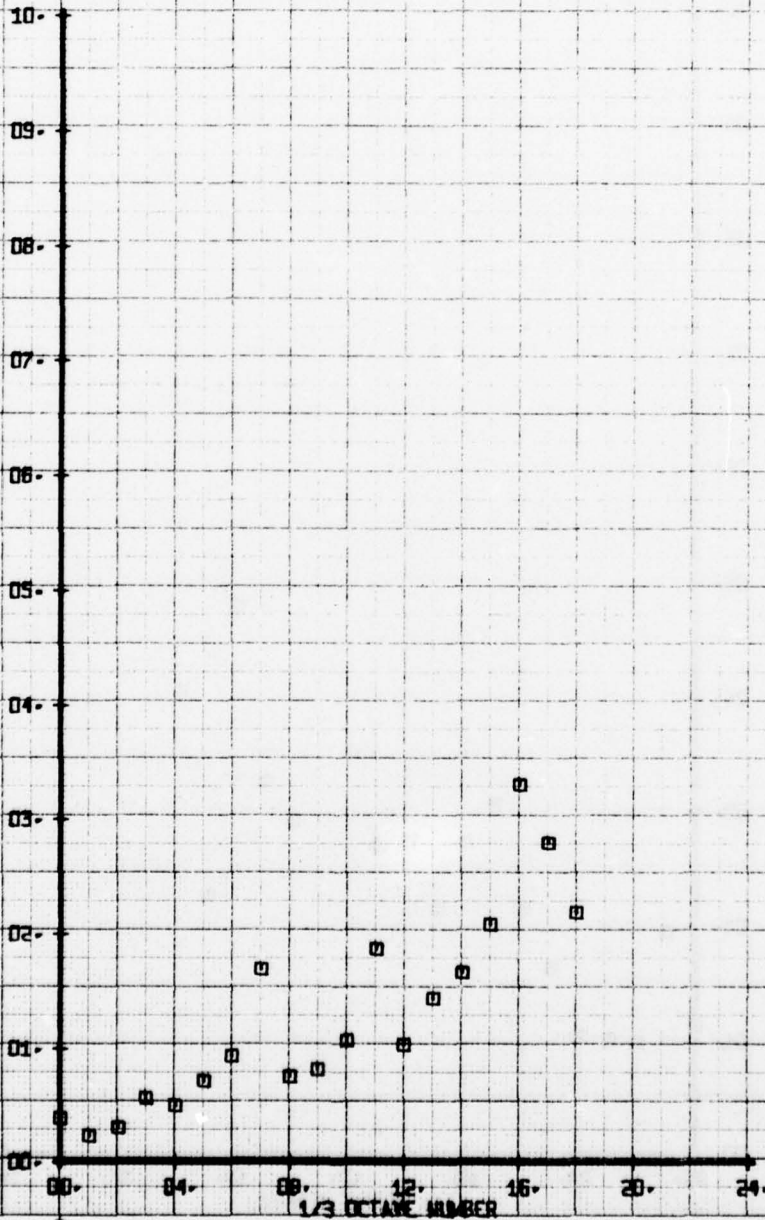
SYM CH PARAMETER
 □ 74 VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 6

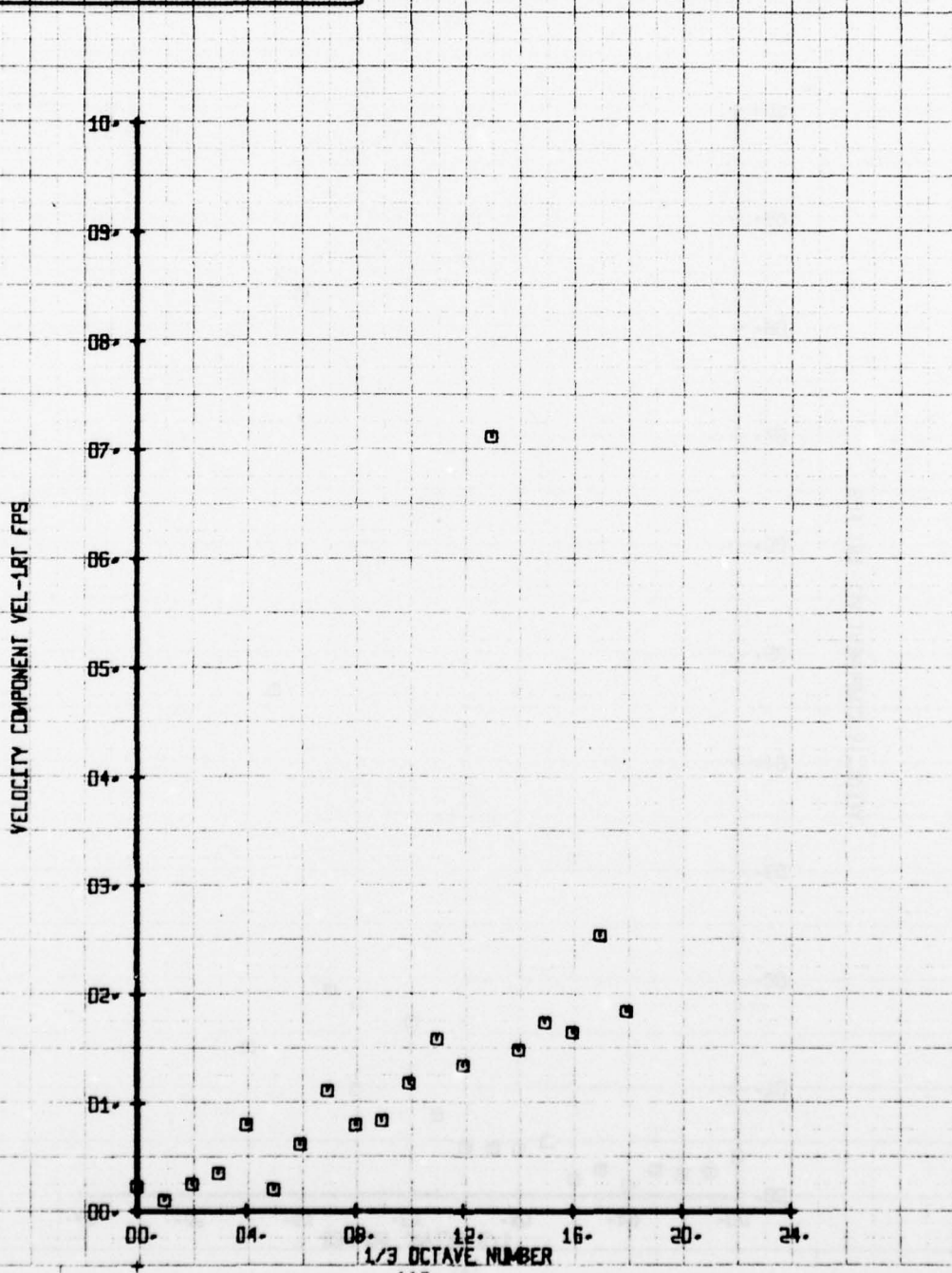
SYM CH PARAMETER
□ 74 VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



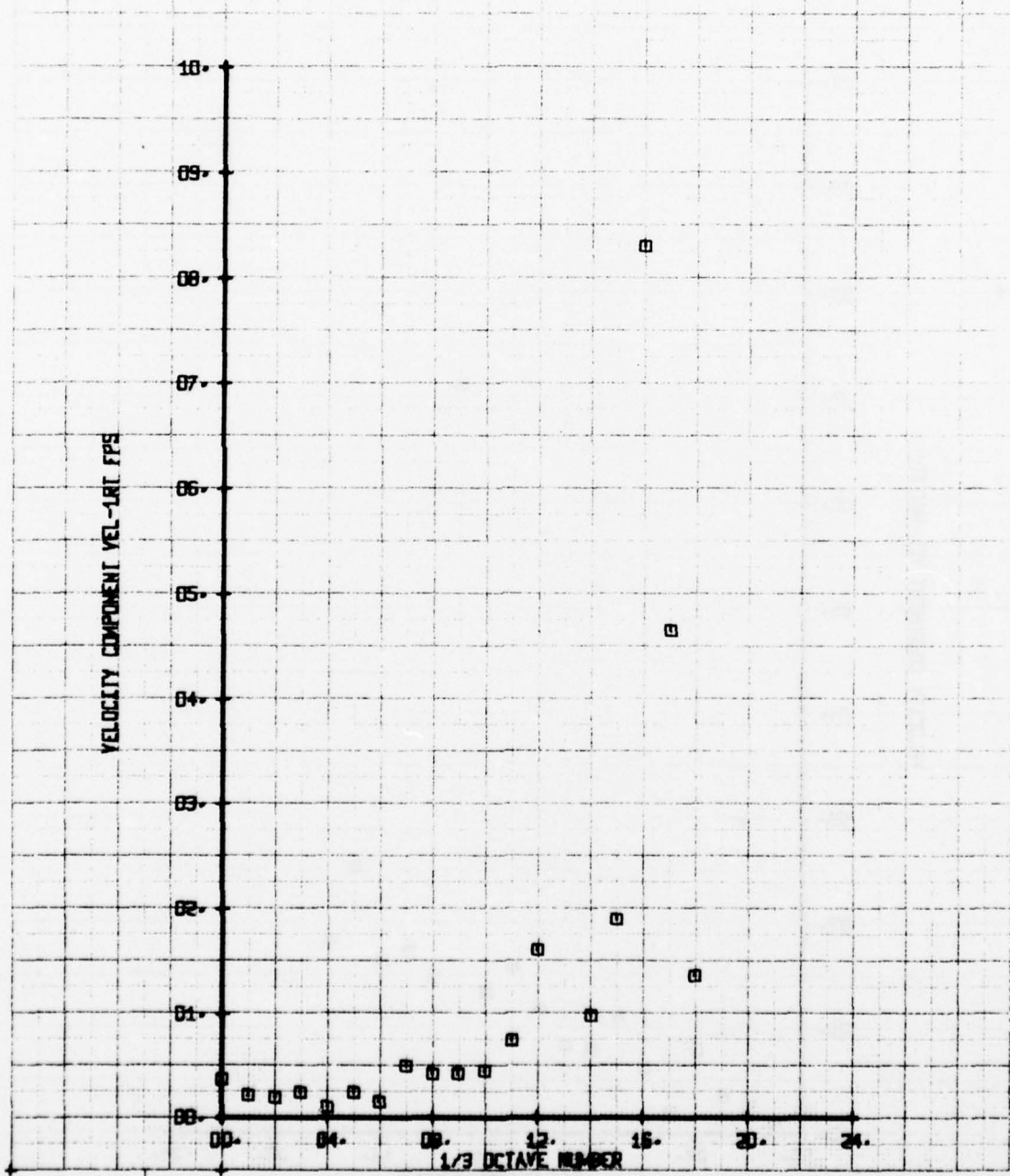
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 7

SYM CH PARAMETER
□ 74 VEL-1RT



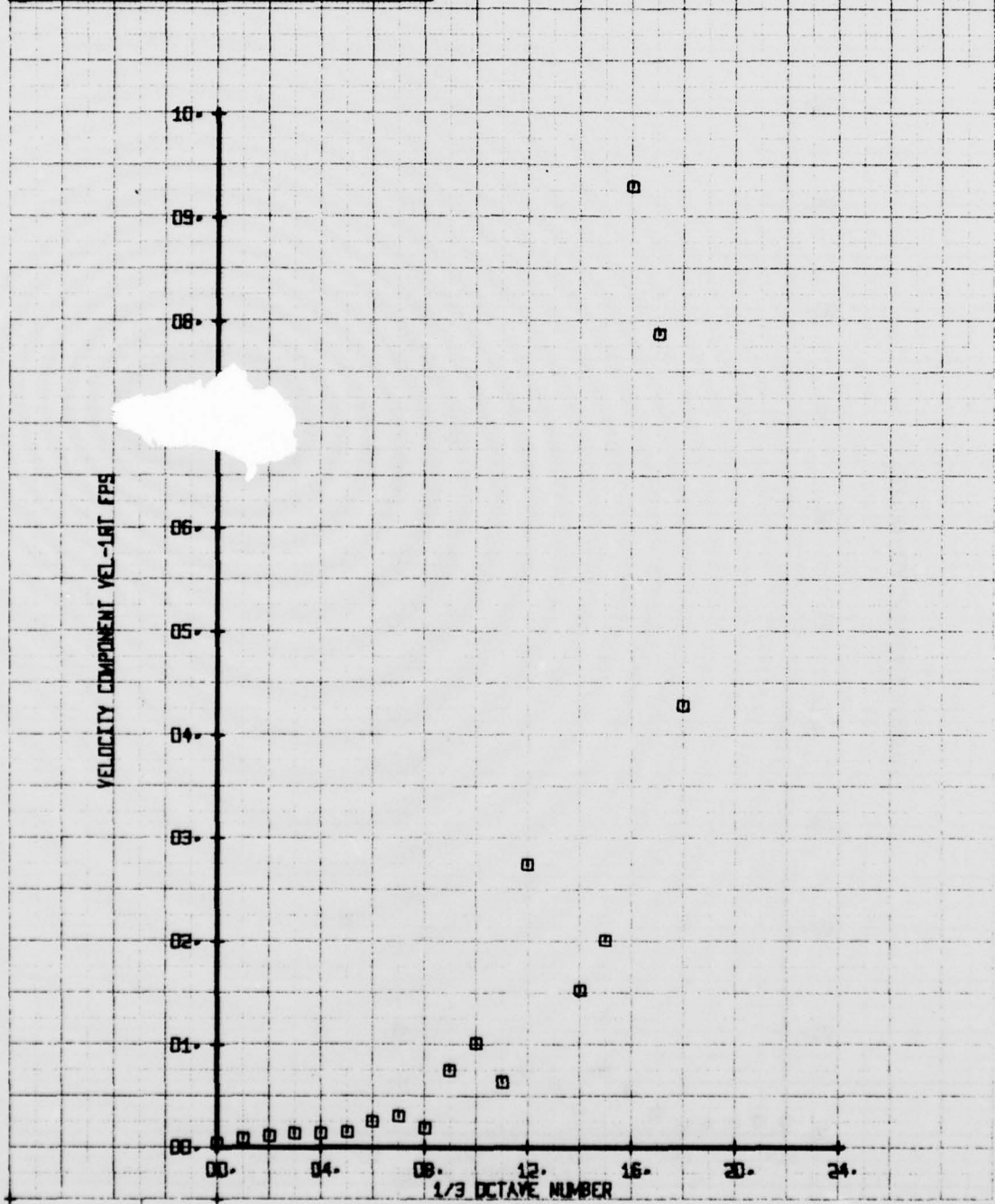
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 8

LEGEND	
SYM	CH PARAMETER
□	74 VEL-1RT



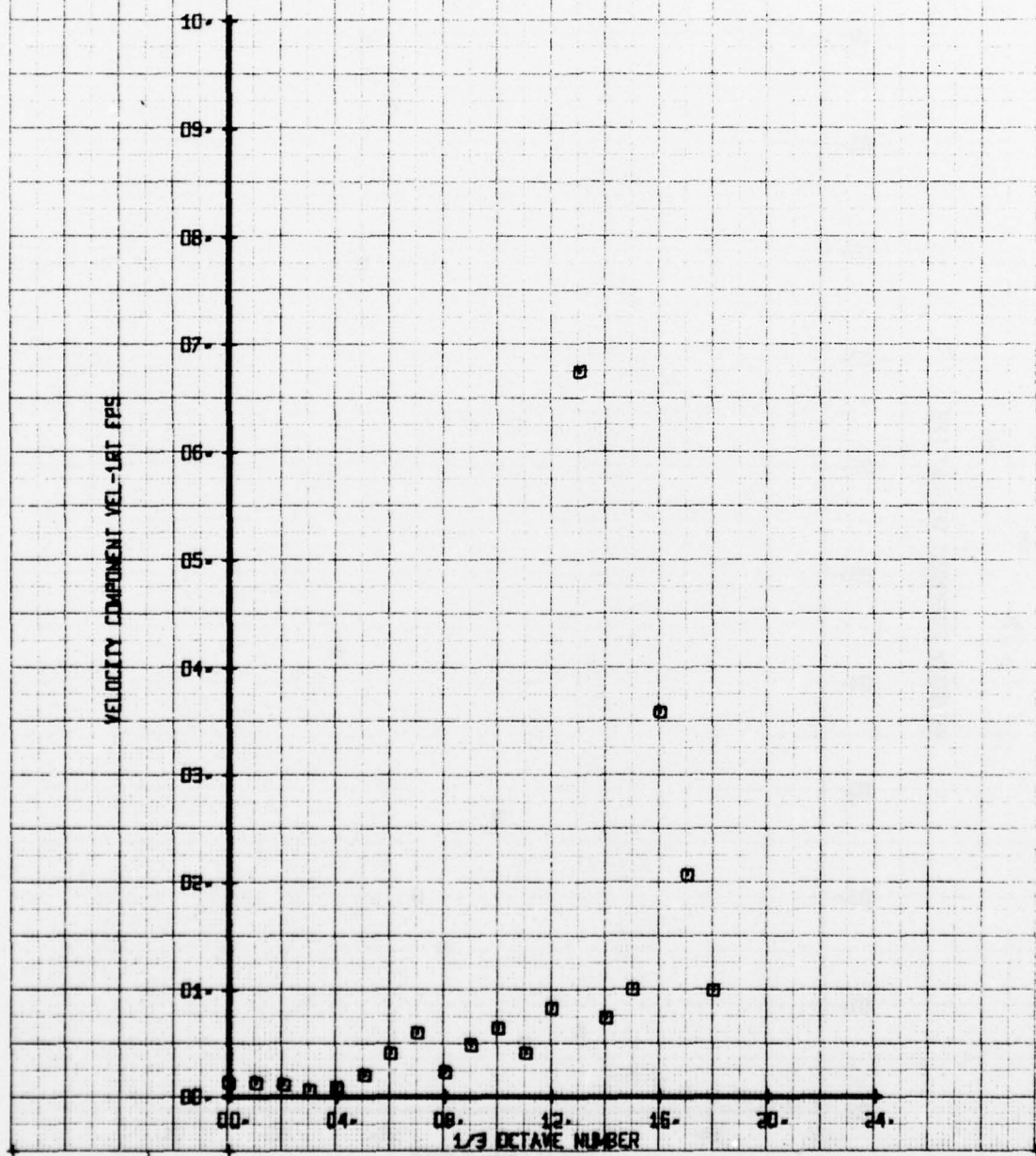
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 9

SYM	CH	PARAMETER
□	74	VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 10

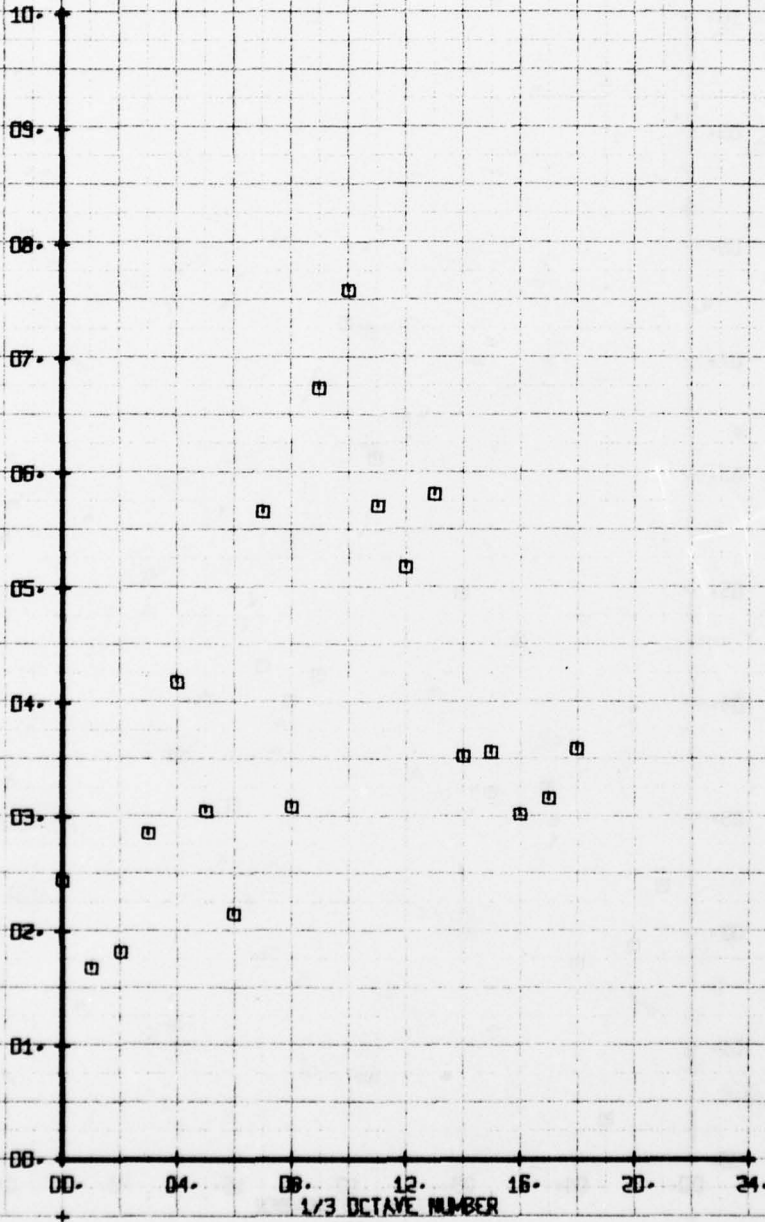
LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



HOT FILM WIRE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60RT
RUN 150 TP 2

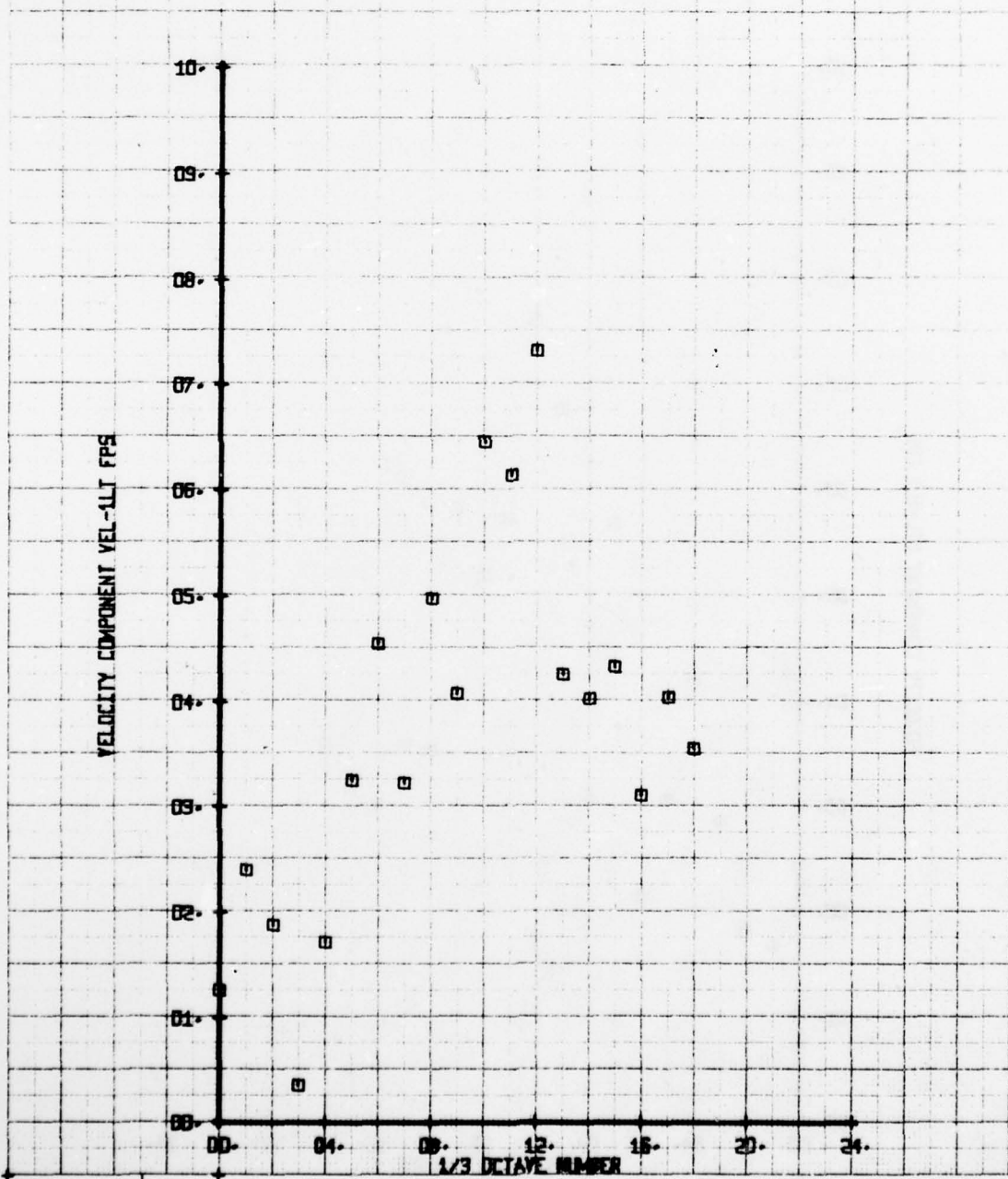
SYM	CH	PARAMETER
□	73	VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 3

SYN CH PARAMETER
□ 73 VEL-1LT

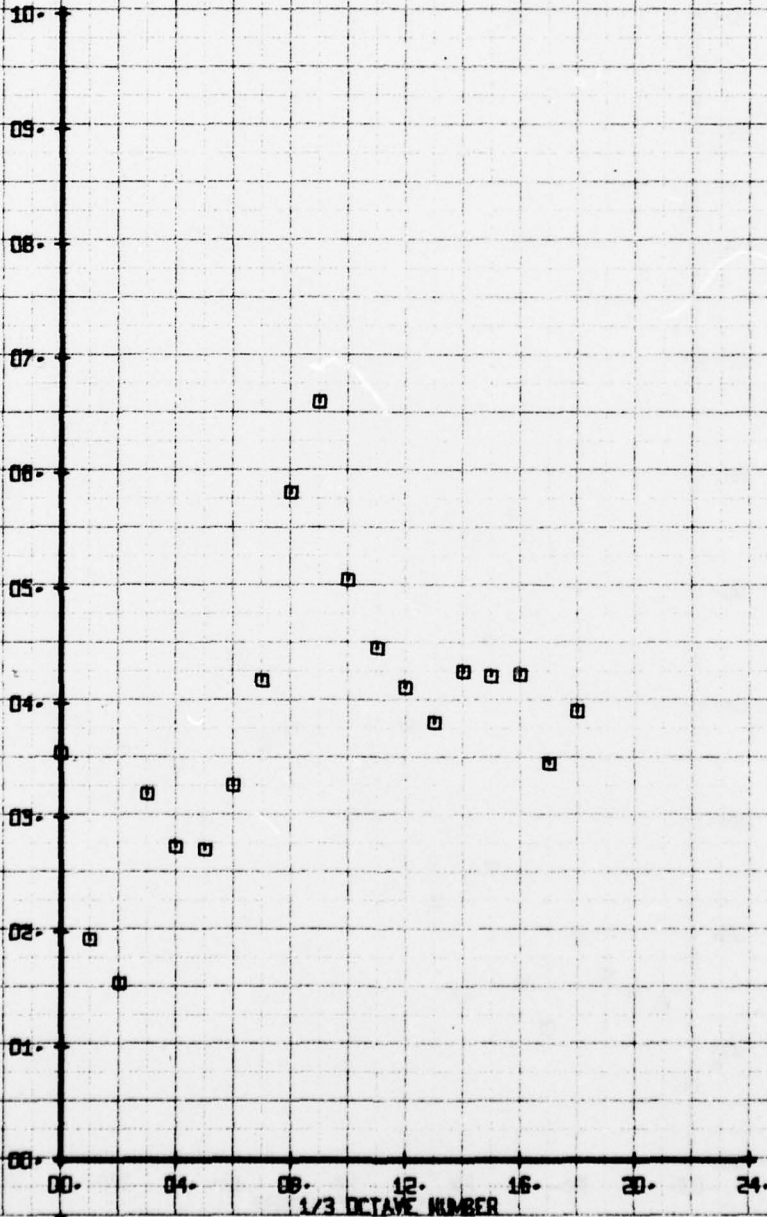


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60M7
RUN 150 TP 4

SYM
□

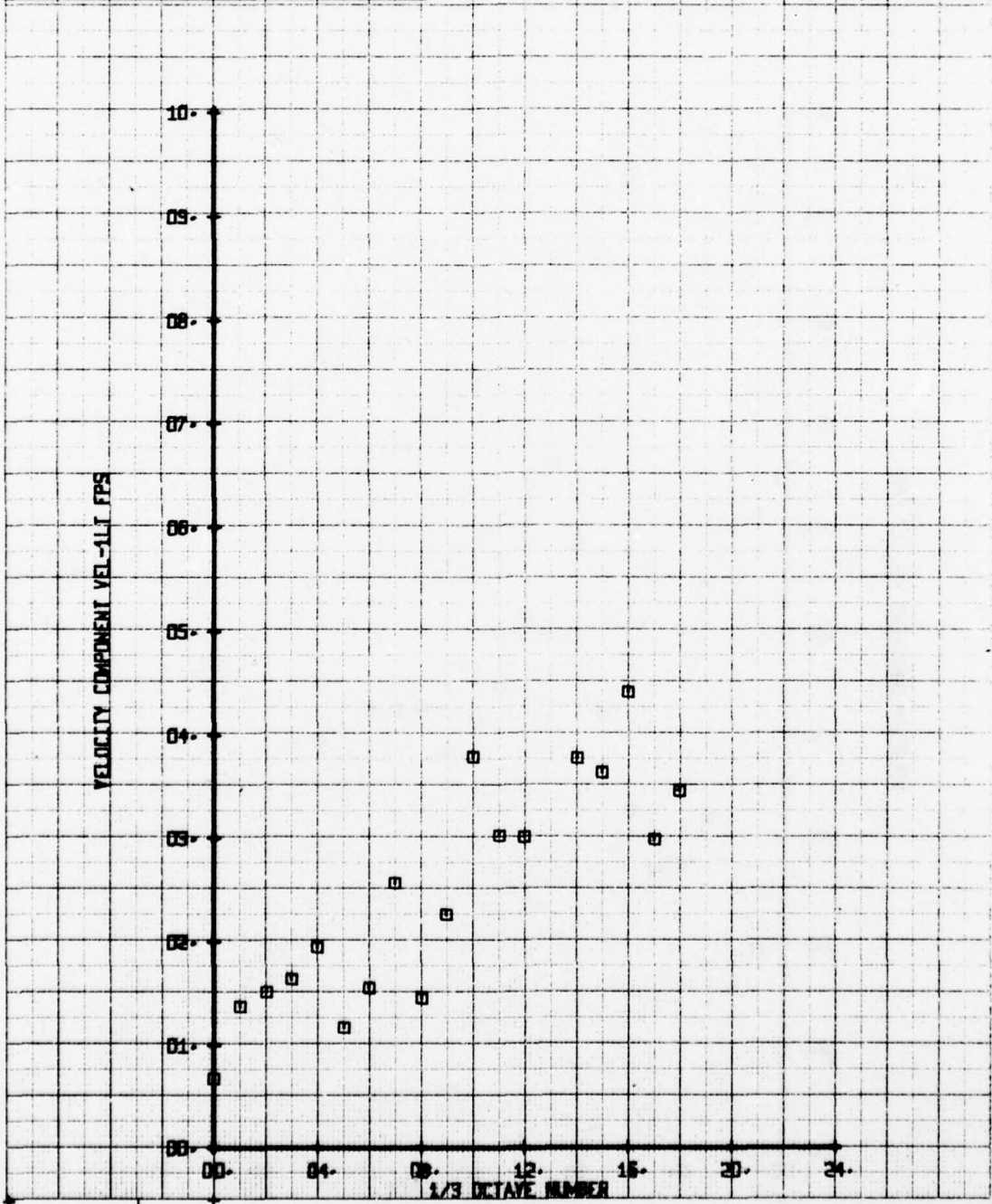
LEGEND
CH 73
PARAMETER
VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 5

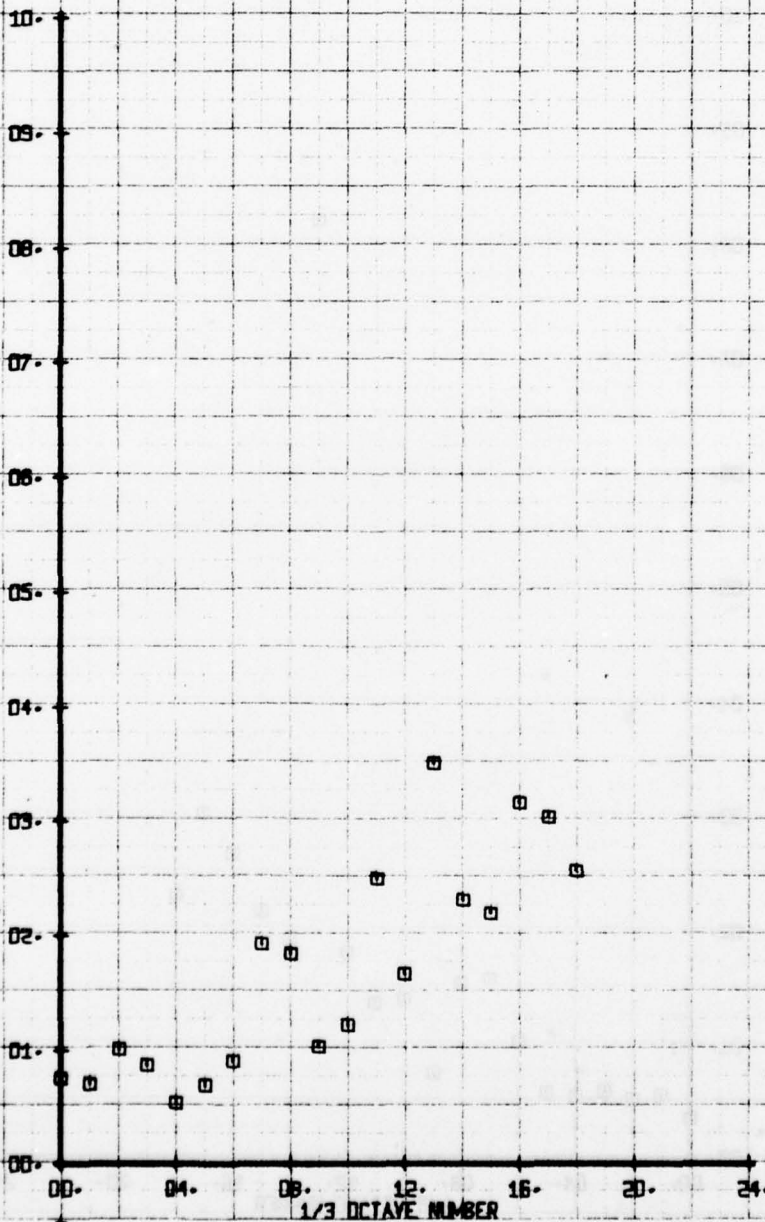
SYM	CH	PARAMETER
□	73	VEL-1LT



NOF FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 6

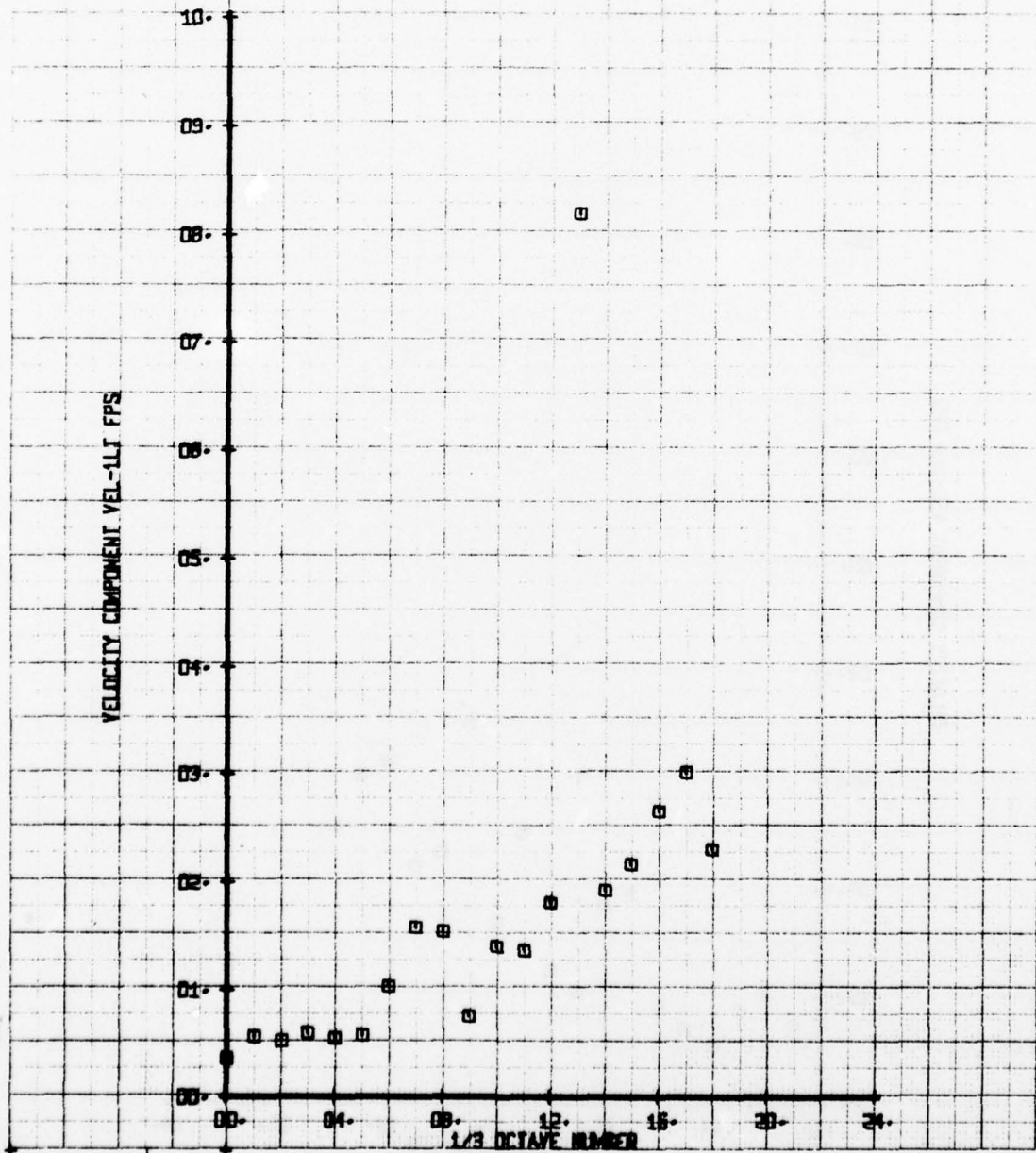
SYM	EN	PARAMETER
□	73	VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 7

LEGEND
SYM CH PARAMETER
□ 73 VEL-1LT

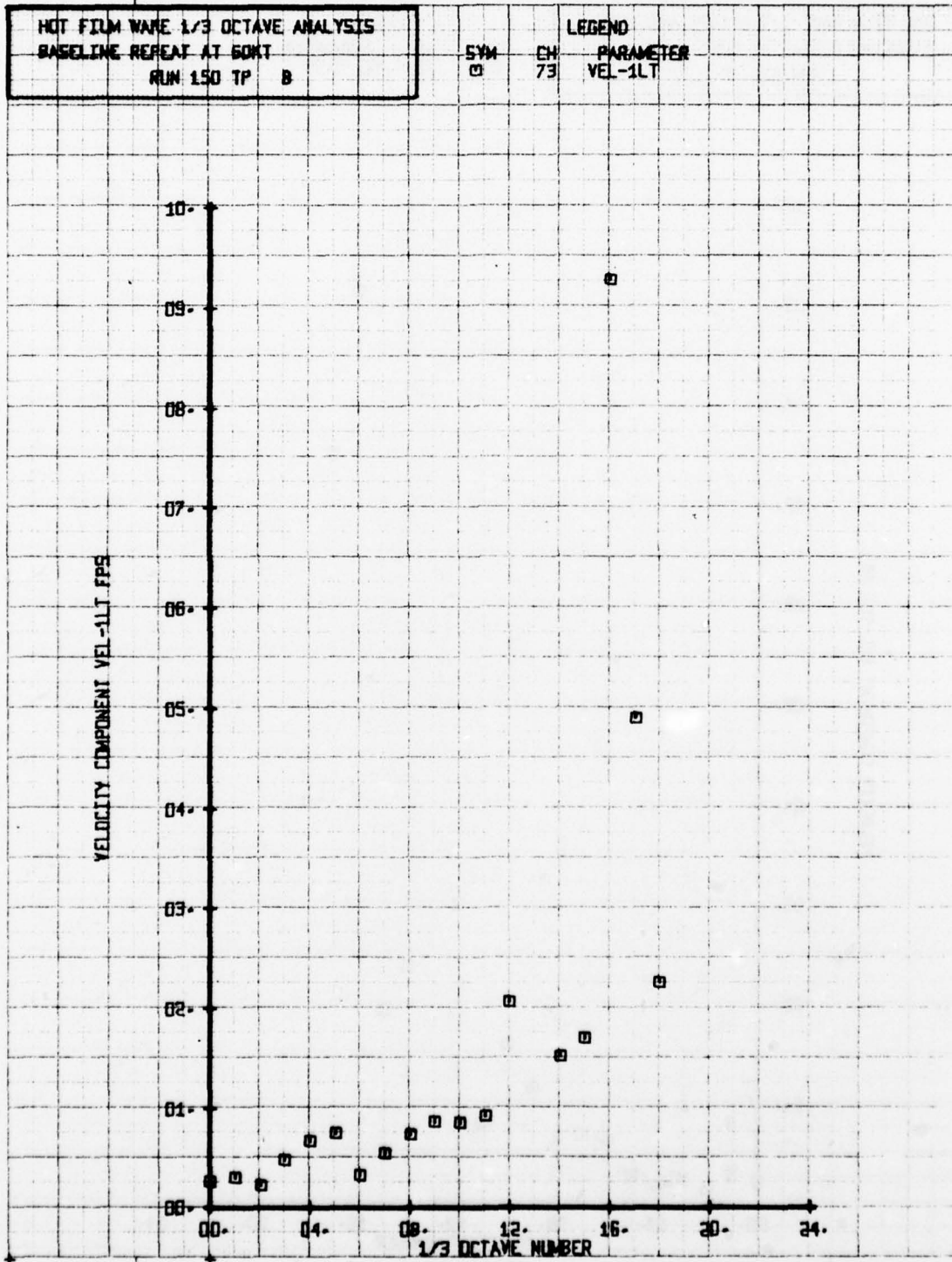


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 50KT
RUN 150 TP B

SYM
□

CH
73

LEGEND
PARAMETER
VEL-1LT



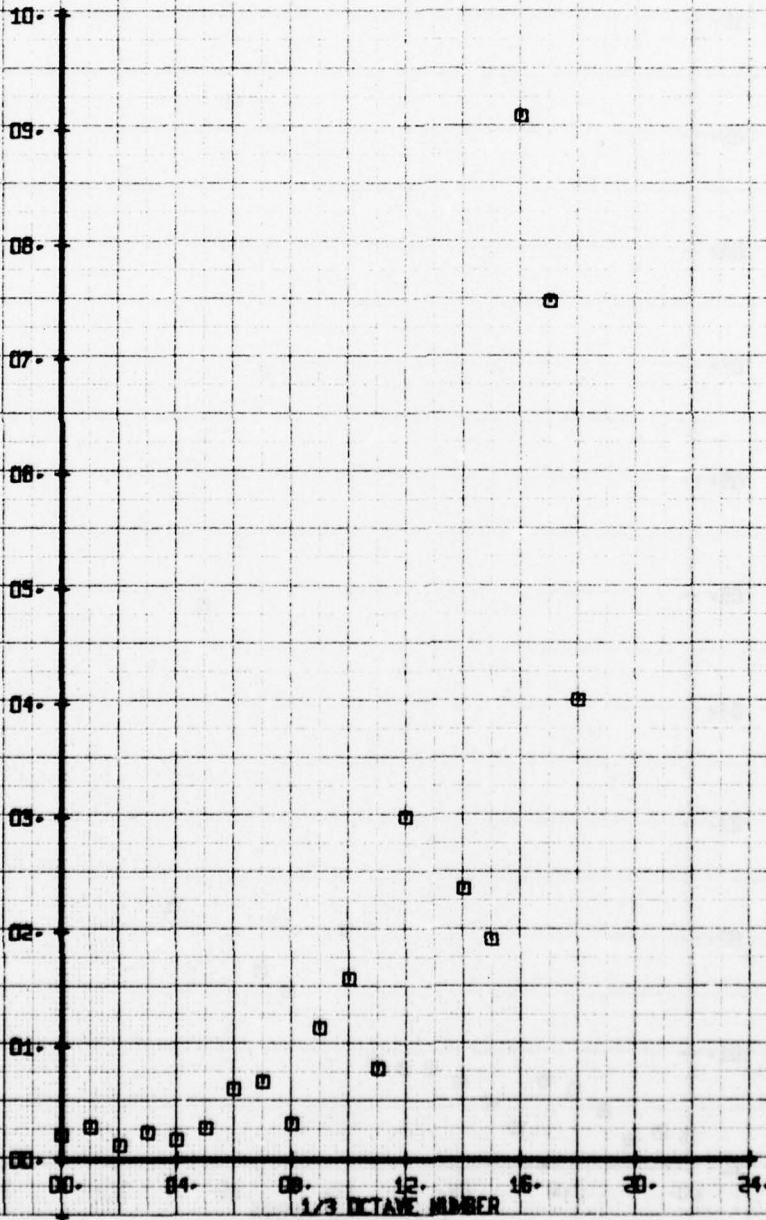
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60KFT
RUN 150 TP 9

SYM
□

EH
73

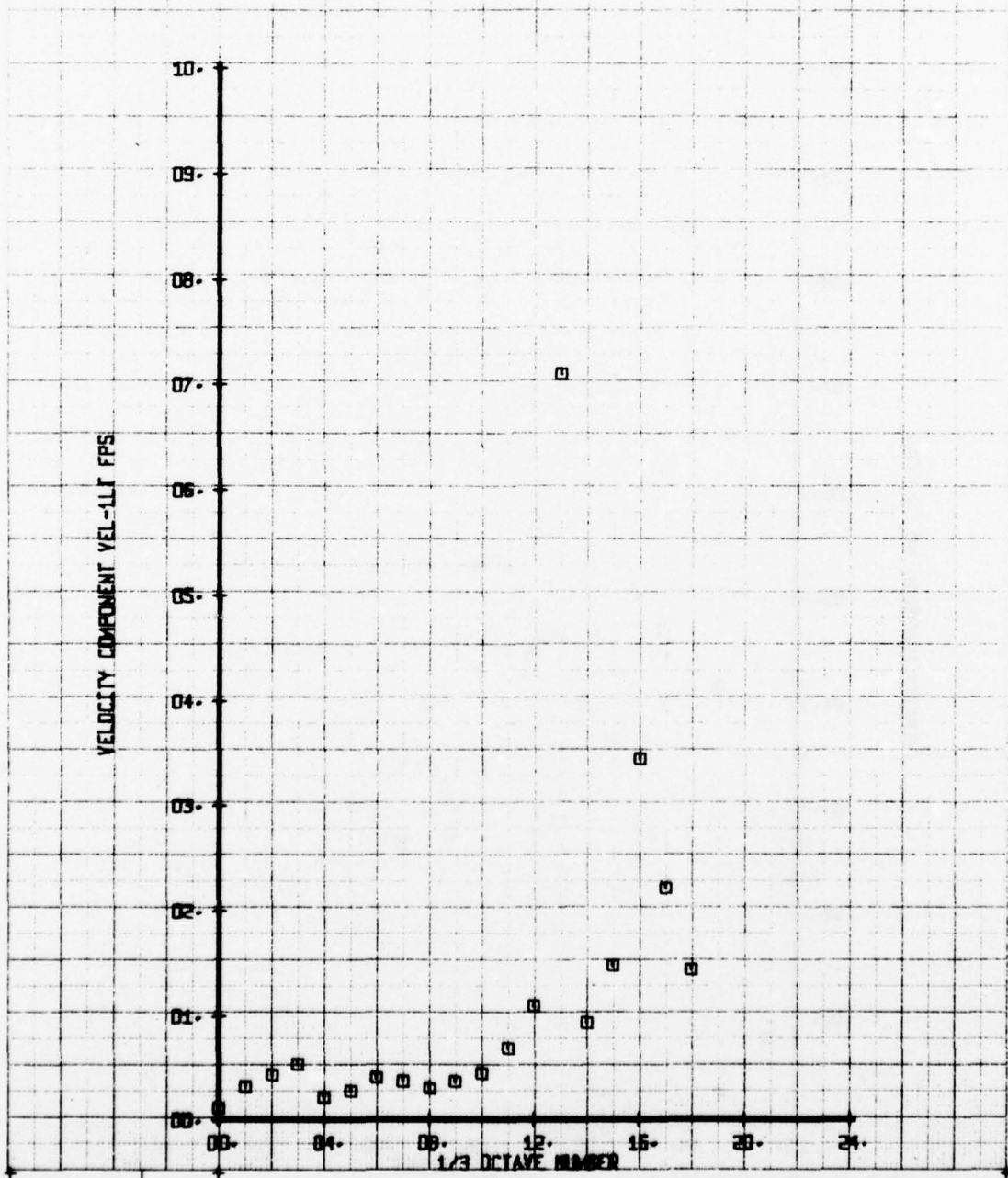
LEGEND
PARAMETER
VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 10

LEGEND
SYM CH PARAMETER
□ 73 VEL-1LT.

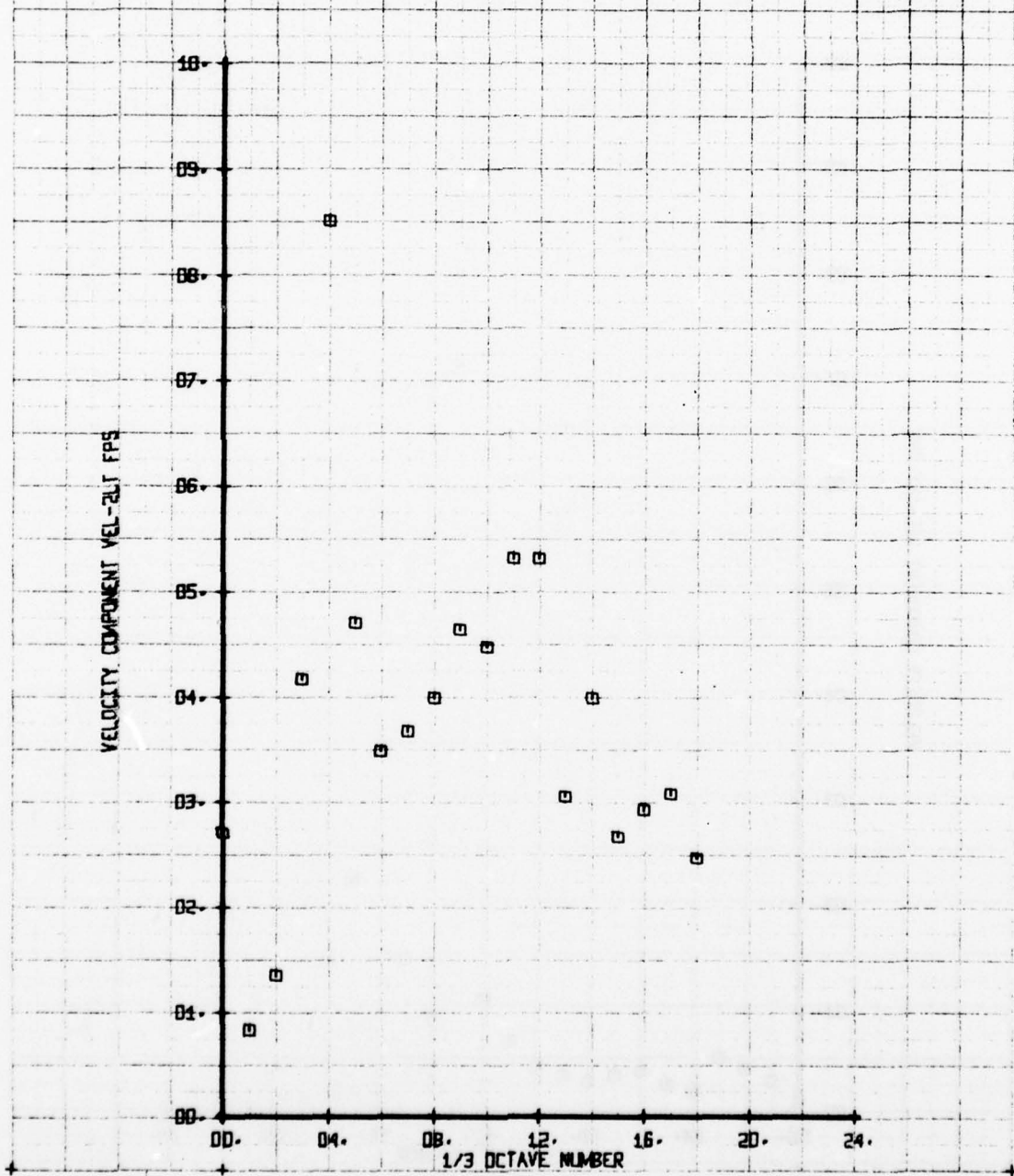


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 2

SYM
□

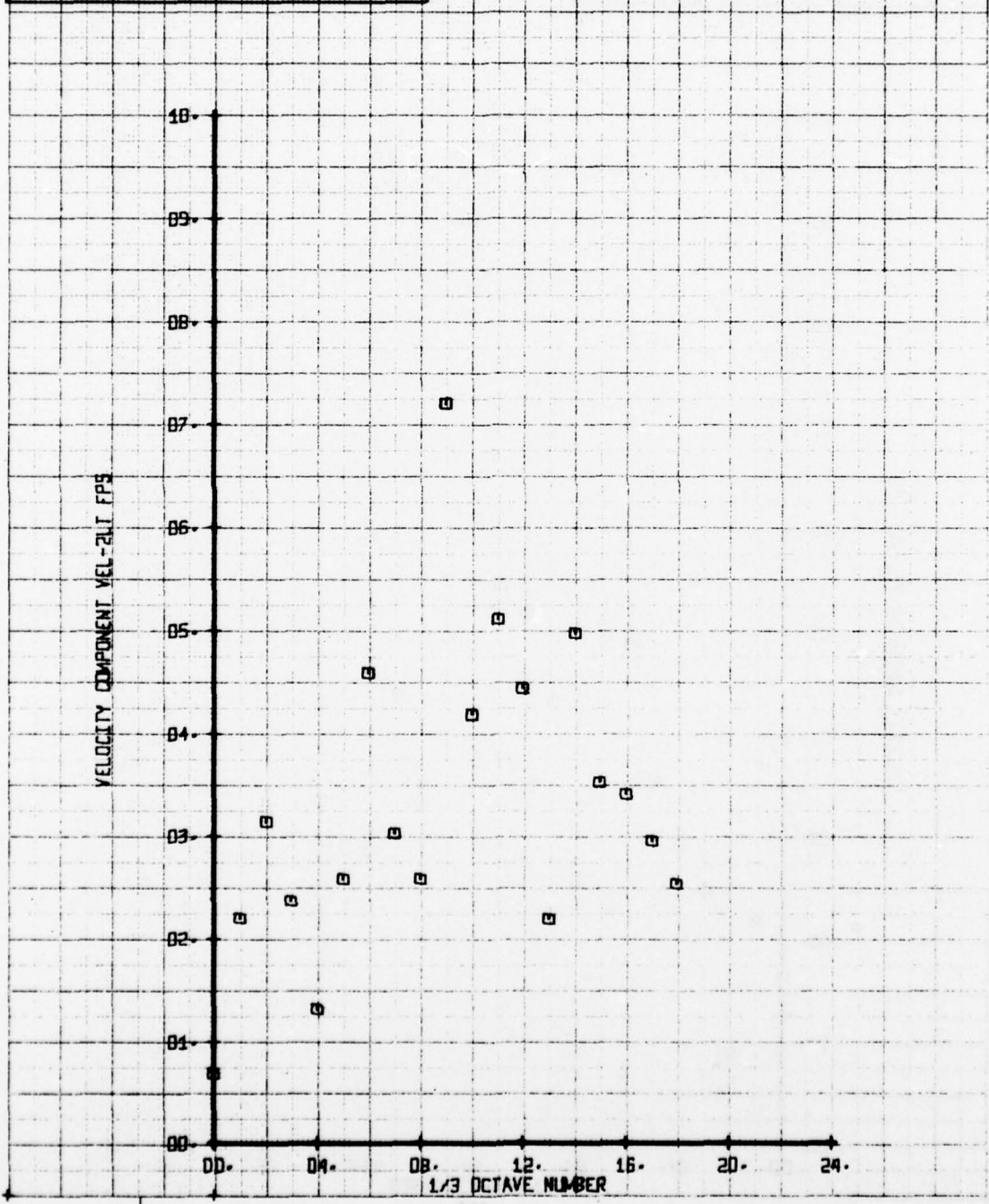
CH
72

LEGEND
PARAMETER
VEL-2LT



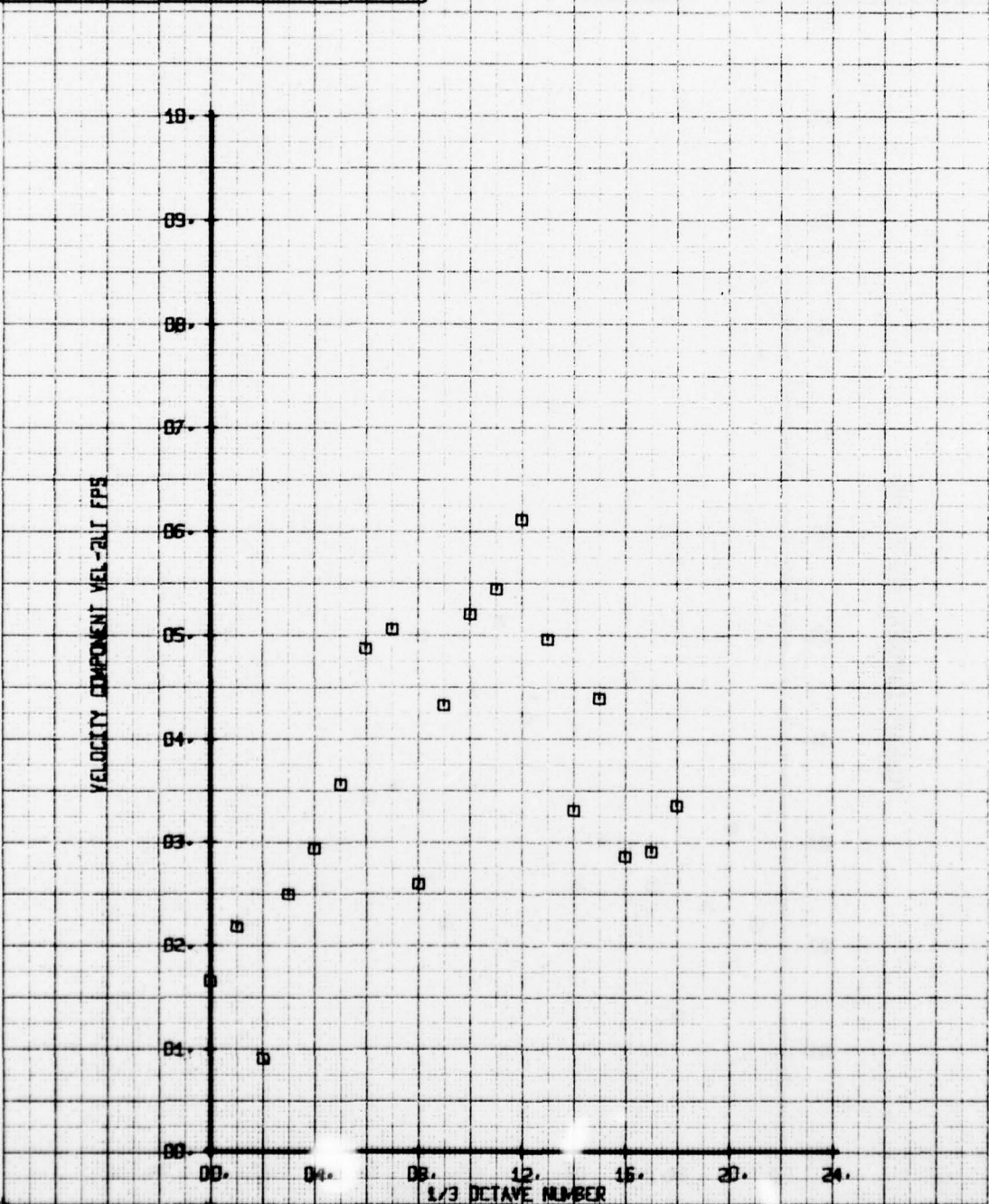
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 1SD TP 3

SYM CH PARAMETER
□ 72 VEL-ZLT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60KT
 RUN 190 TP 4

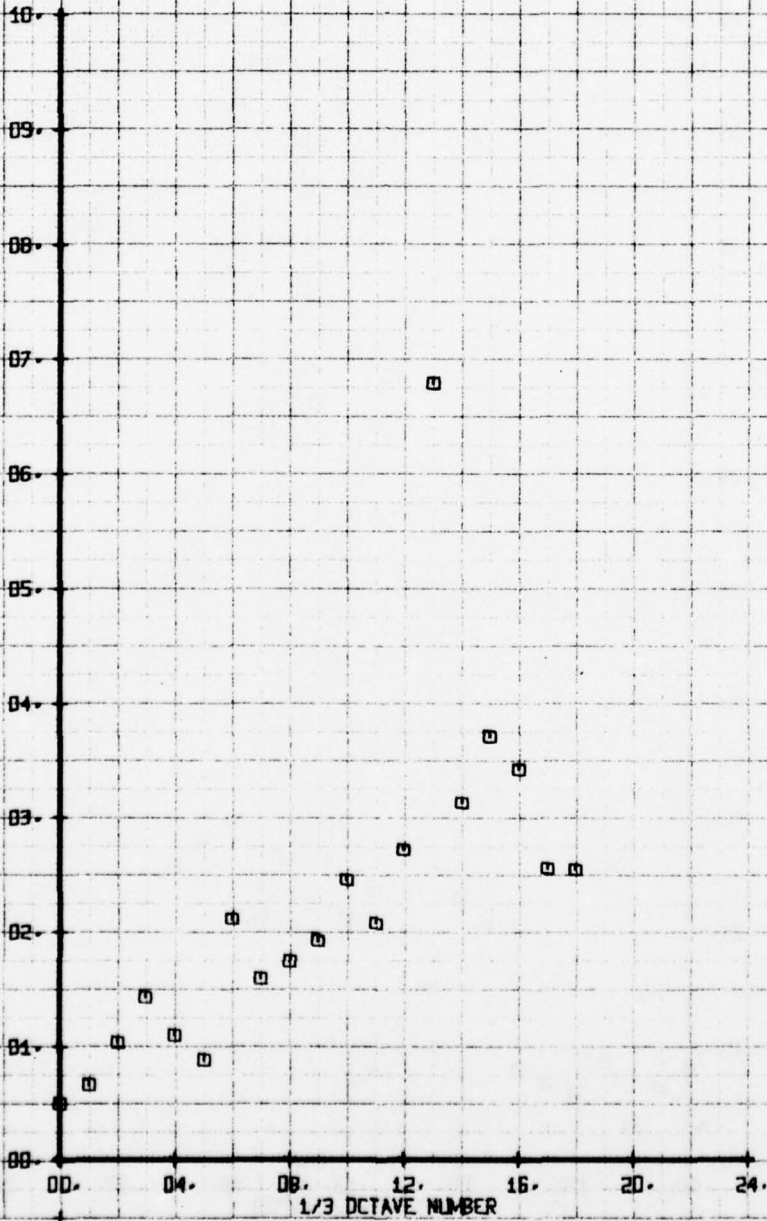
SYN CH PARAMETER
 □ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 5

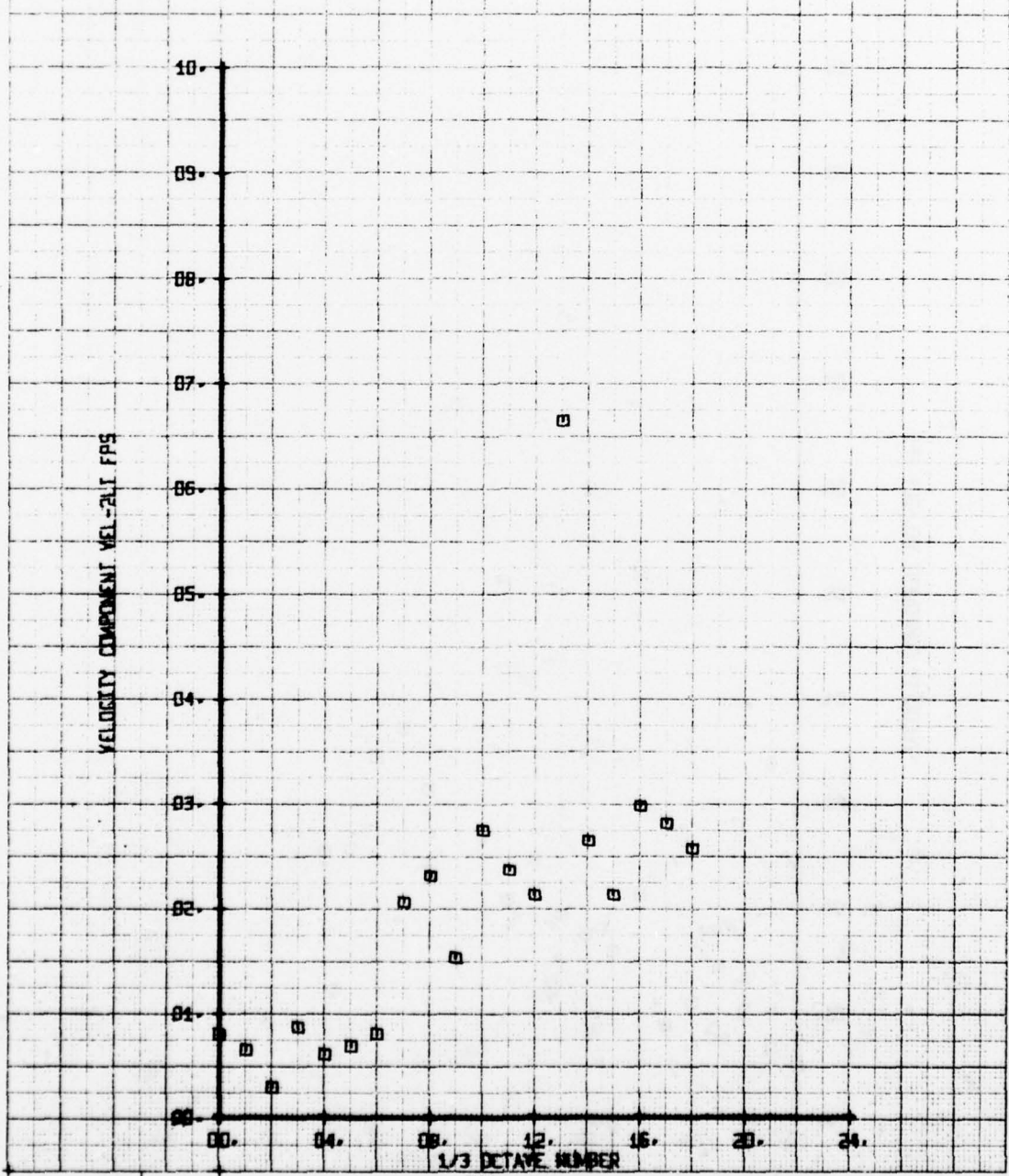
SYM	CH	PARAMETER
□	72	VEL-ZLT

VELOCITY COMPONENT VEL-ZLT FPS



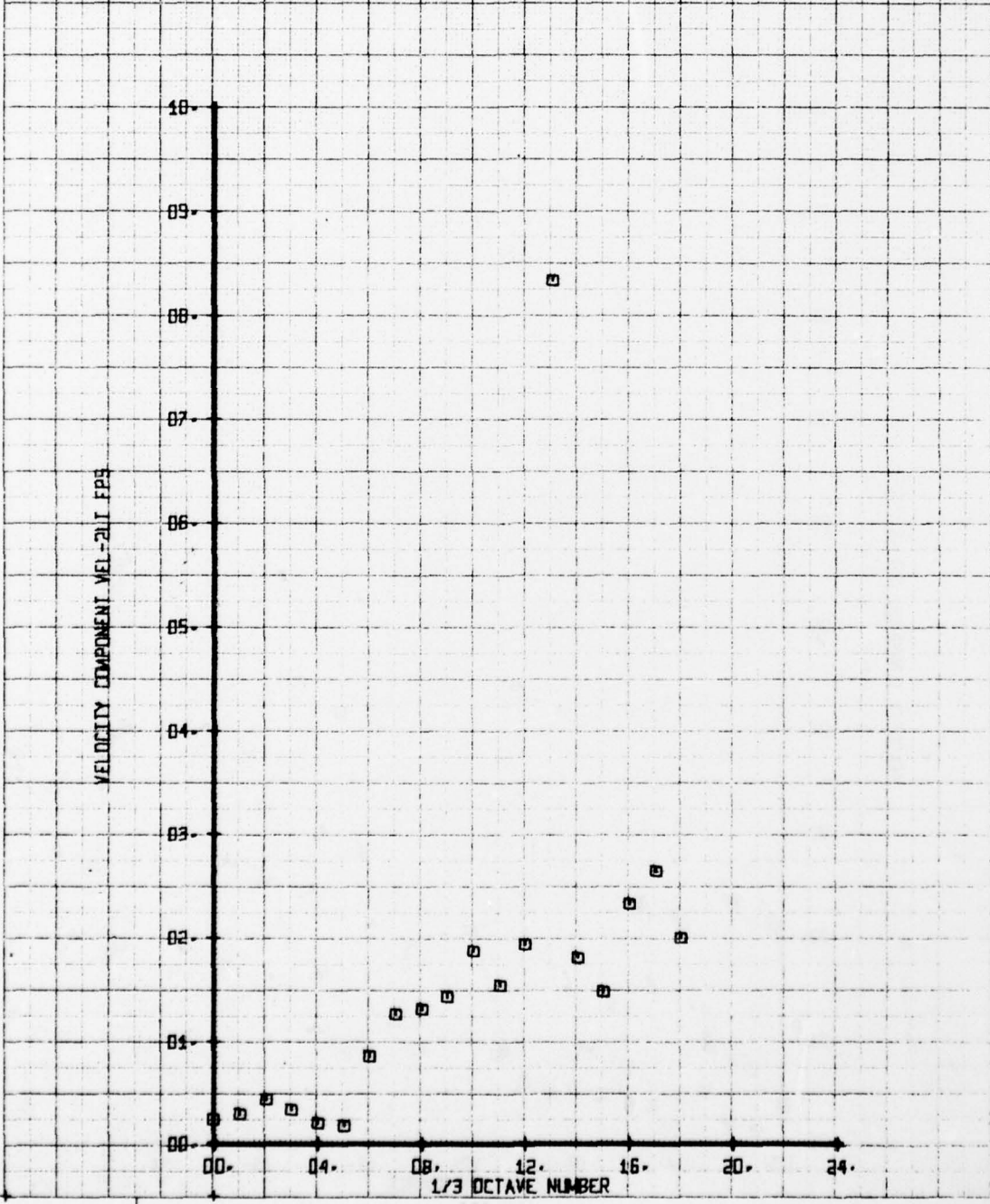
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 6

SYM	CH	PARAMETER
□	72	VEL-2LT



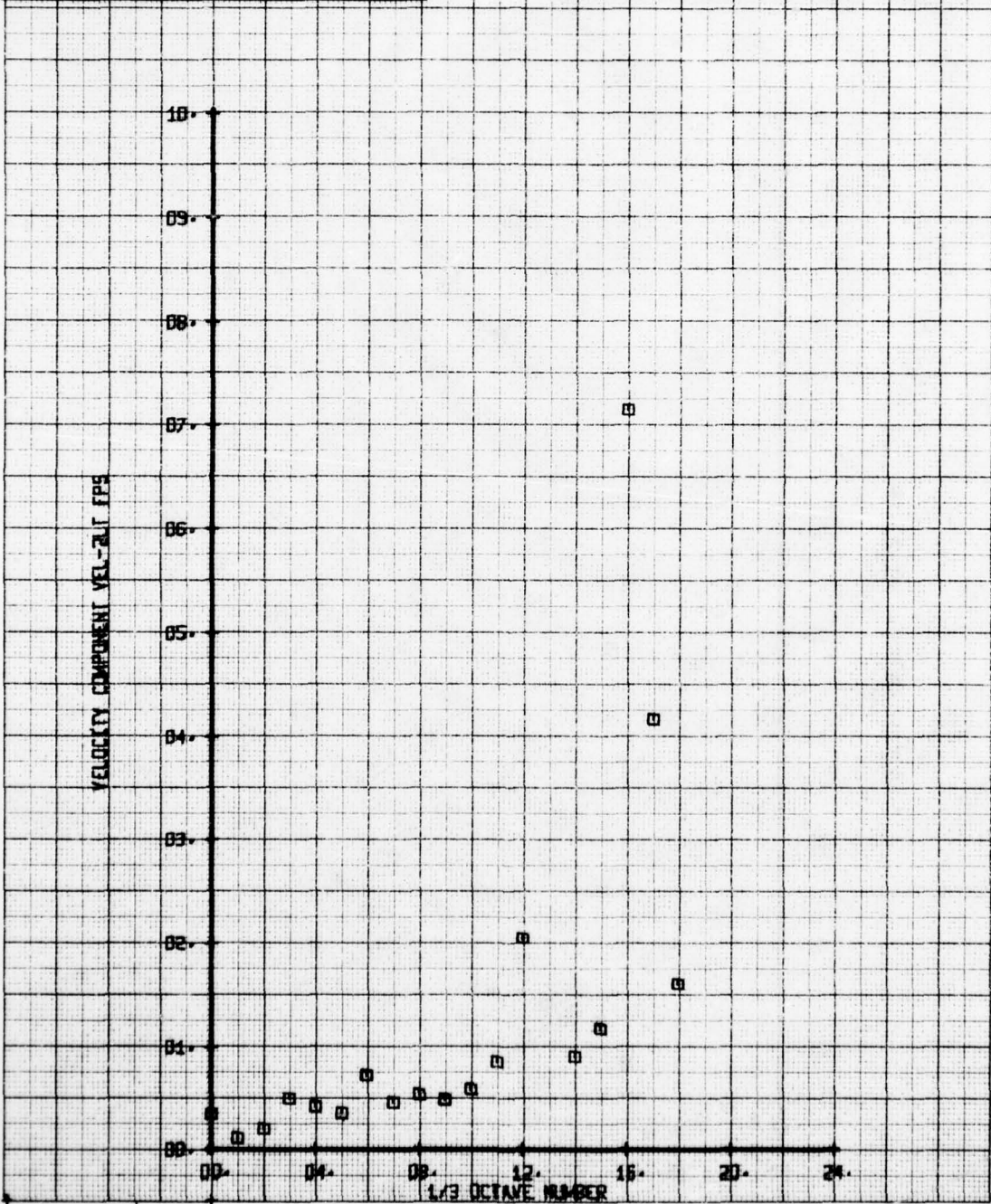
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60KT
 RUN 150 TP 7

SYM	CH	PARAMETER
□	72	VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 6001
 RUN 150 TP B

SYM	CH	PARAMETER
□	72	VEL-2LT

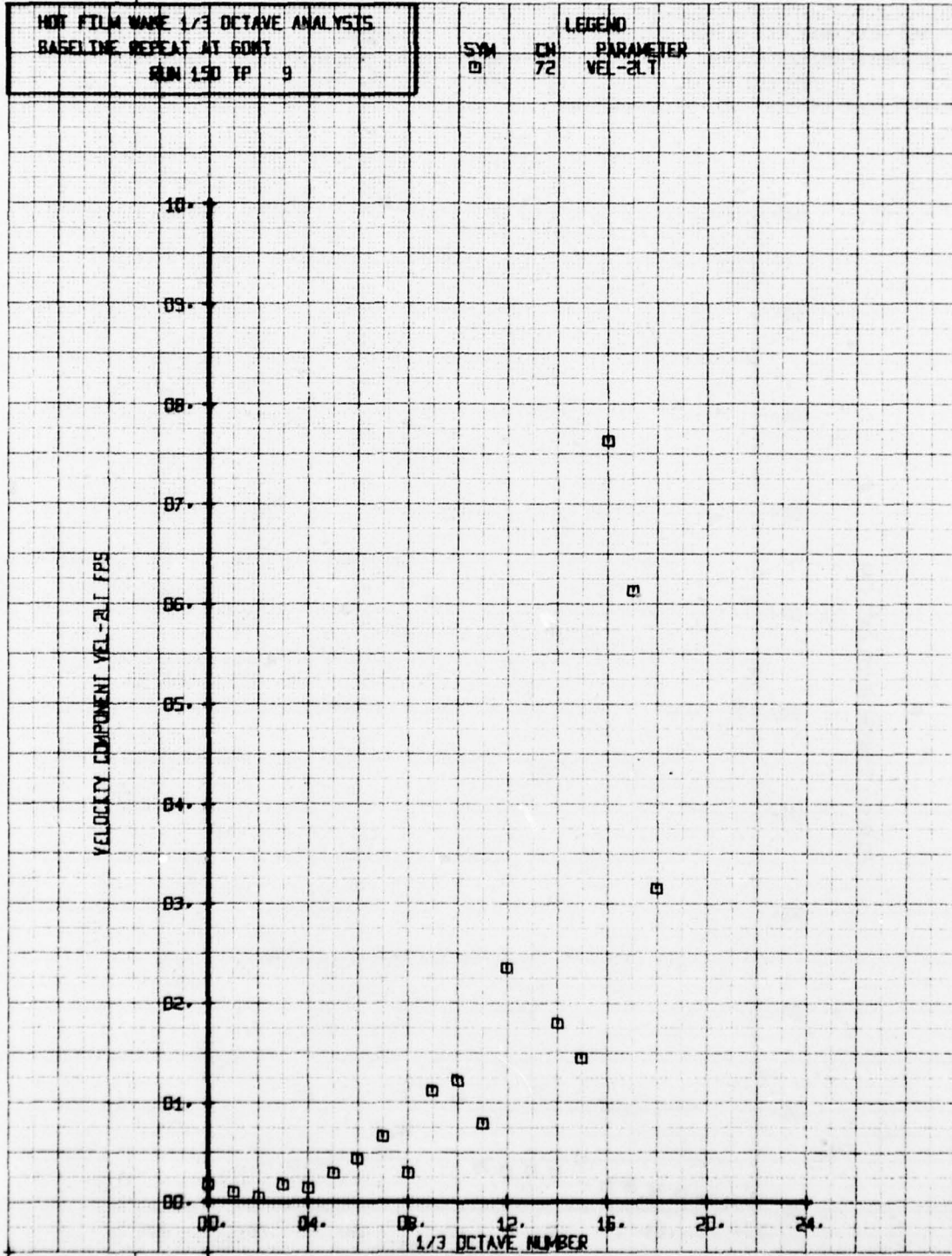


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 9

S/N
0

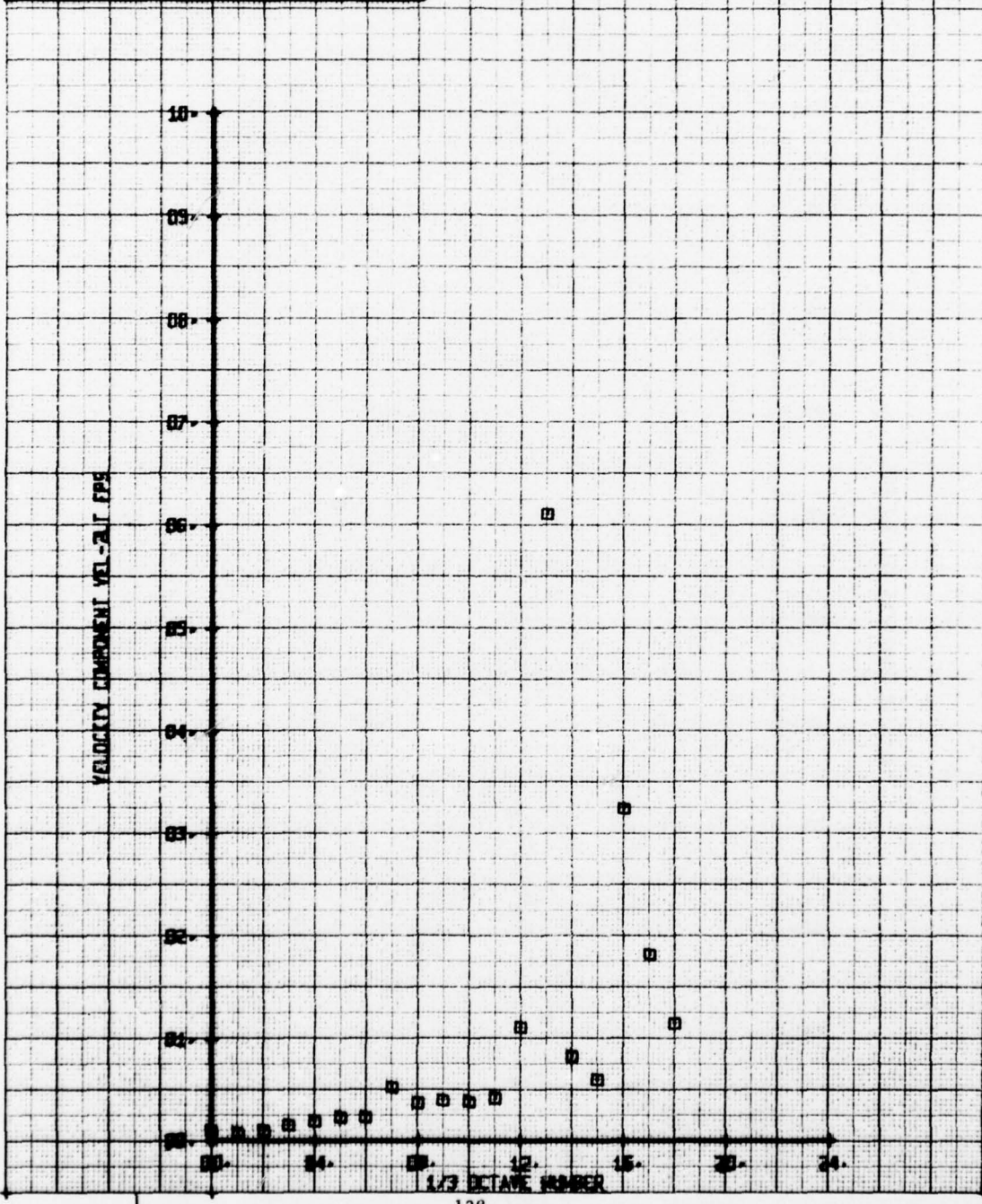
CH
72

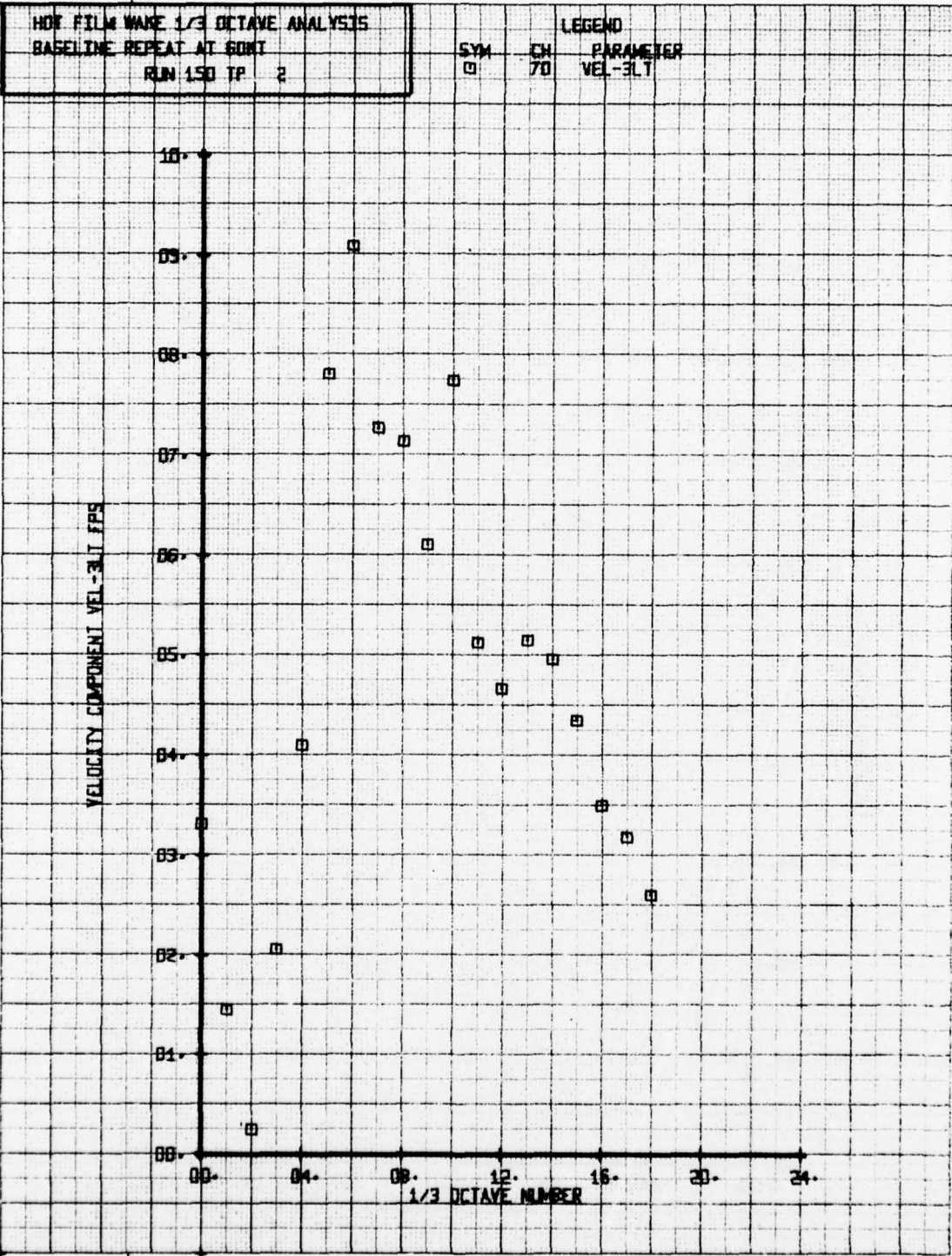
LEGEND
PARAMETER
VEL-ZLT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 10

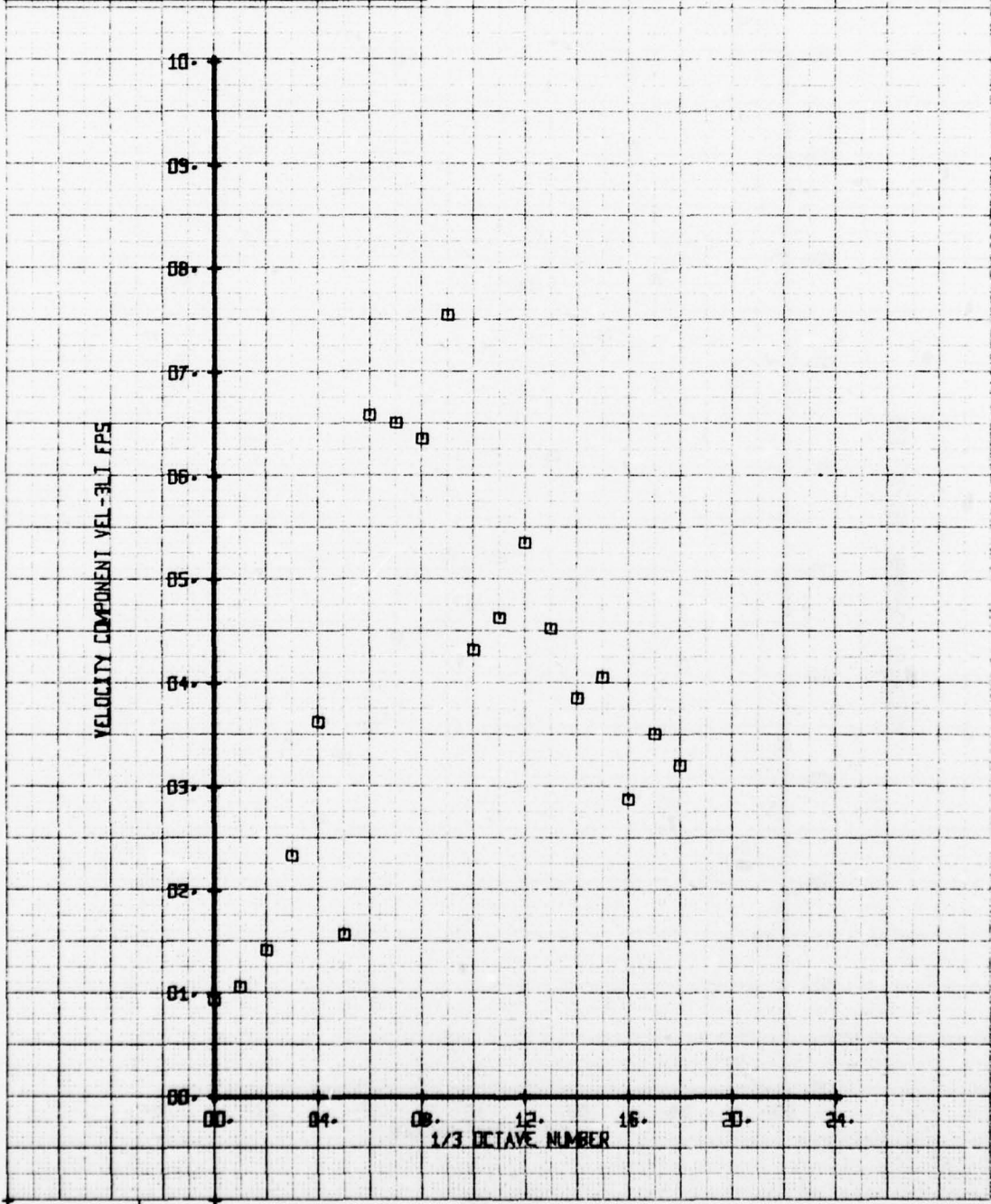
SYM CH PARAMETER
 □ 72 VEL-2LT





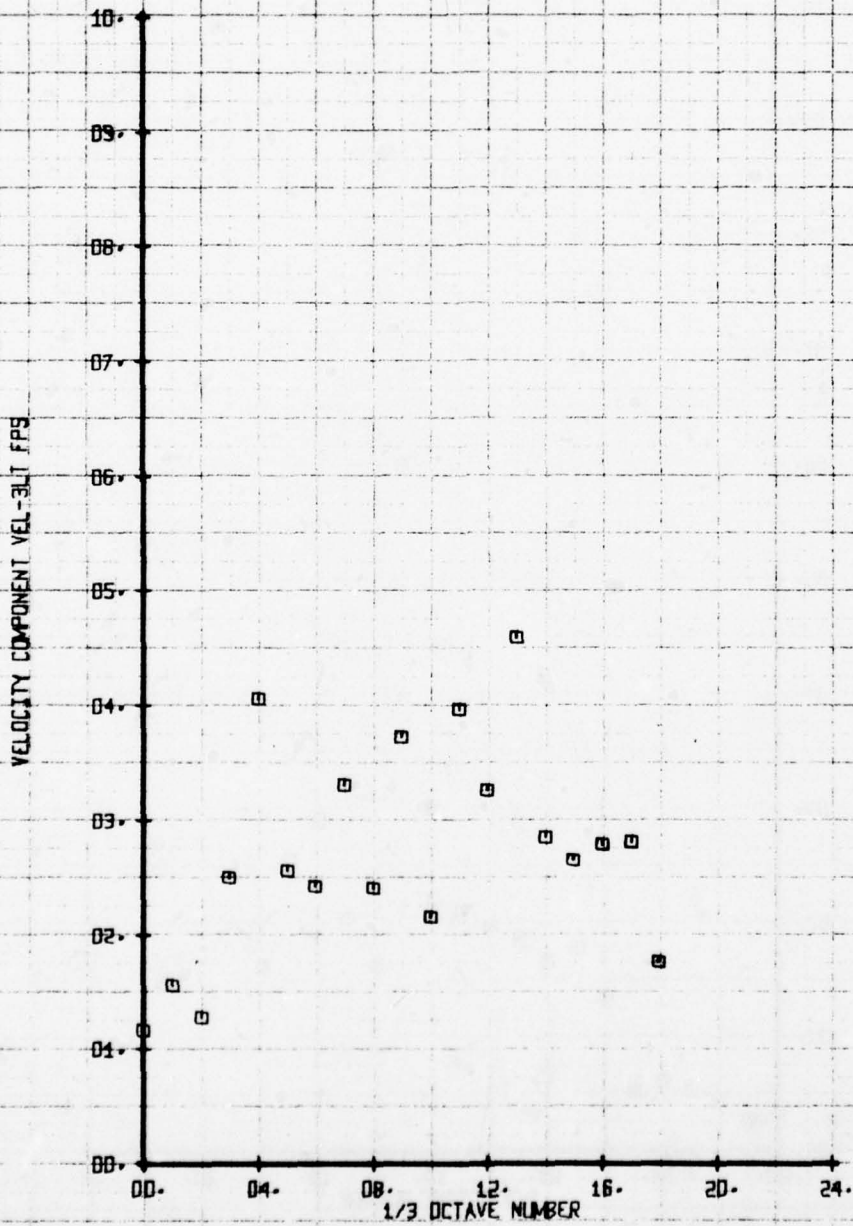
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 3

SYM	CH	PARAMETER
□	70	VEL-3LT



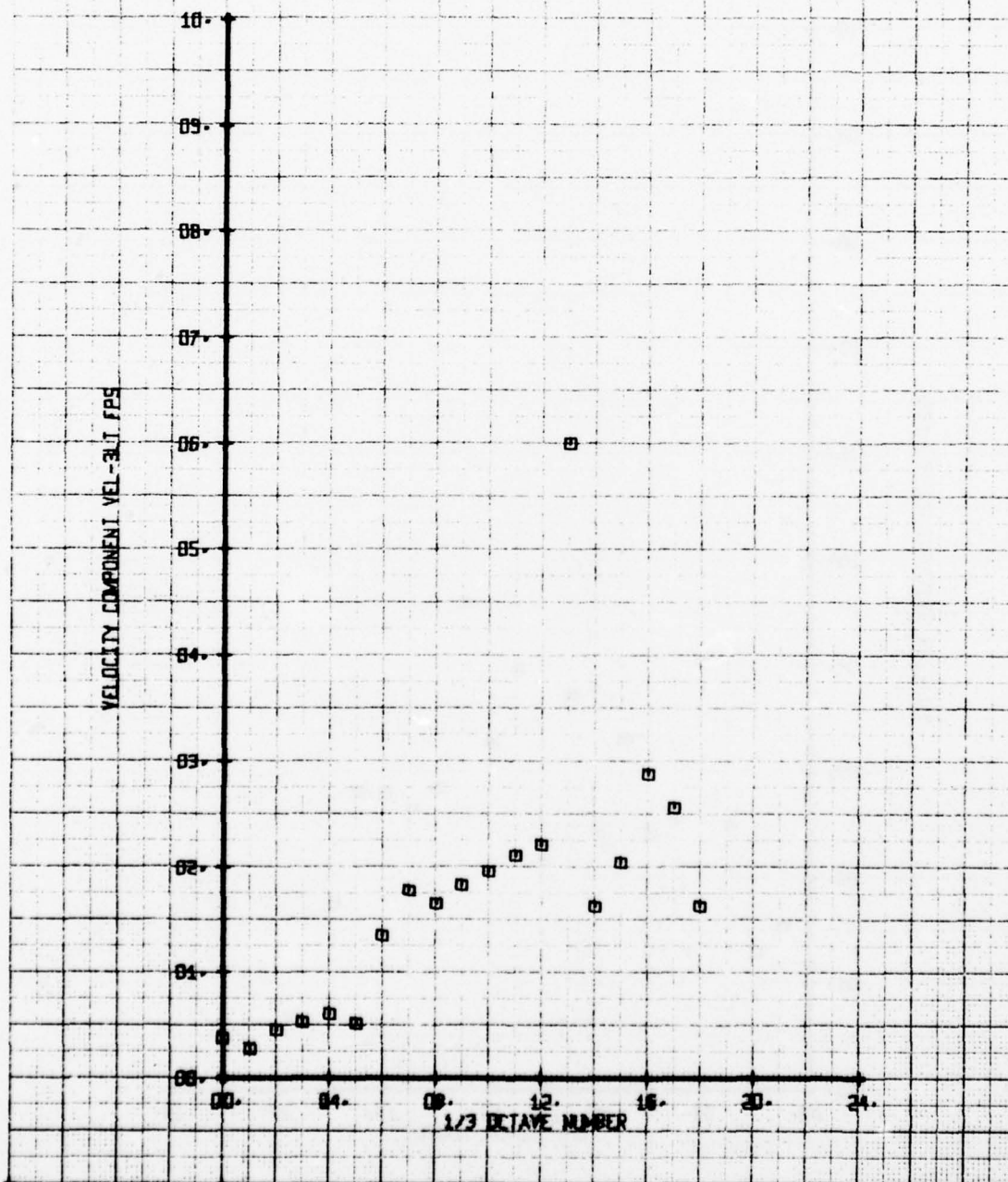
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 4

SYM	CH	PARAMETER
□	70	VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 5

SYN CH PARAMETER
□ 70 VEL-3LT

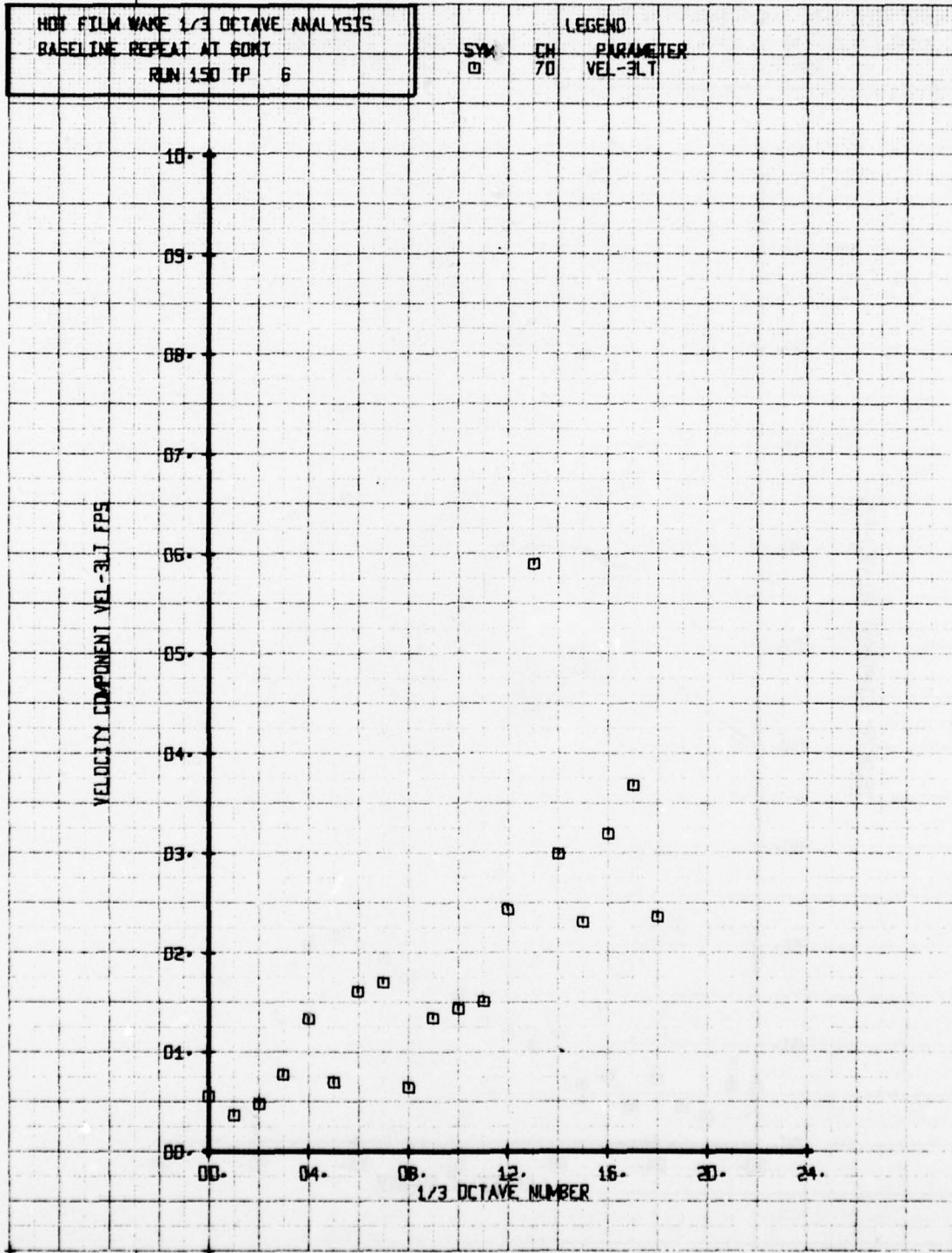


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60MT
RUN 150 TP 6

SYM
□

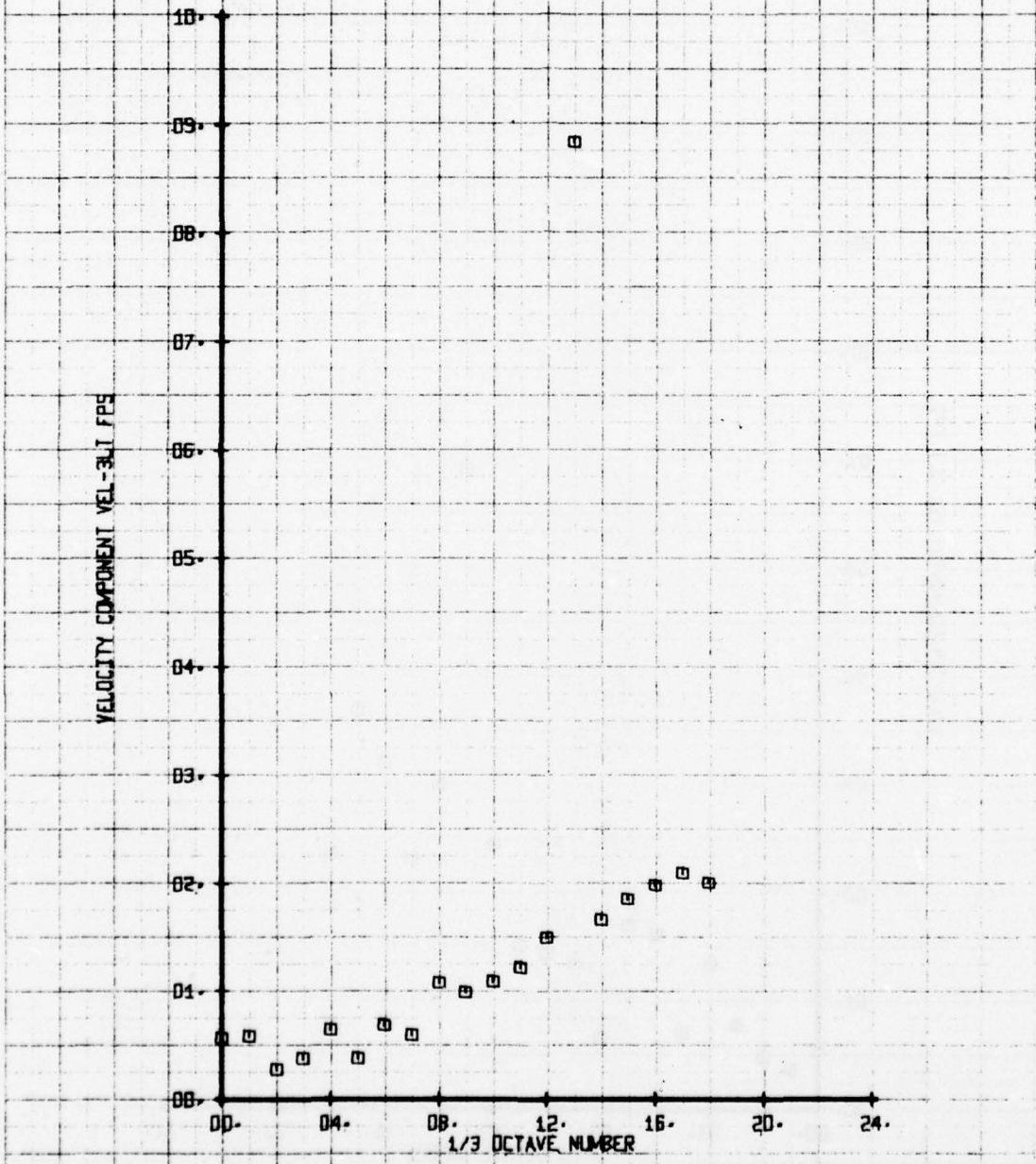
CH
70

LEGEND
PARAMETER
VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60RT
 RUN 150 TP 7

SYM	CH	PARAMETER
□	70	VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS

BASELINE REPEAT AT 60MT

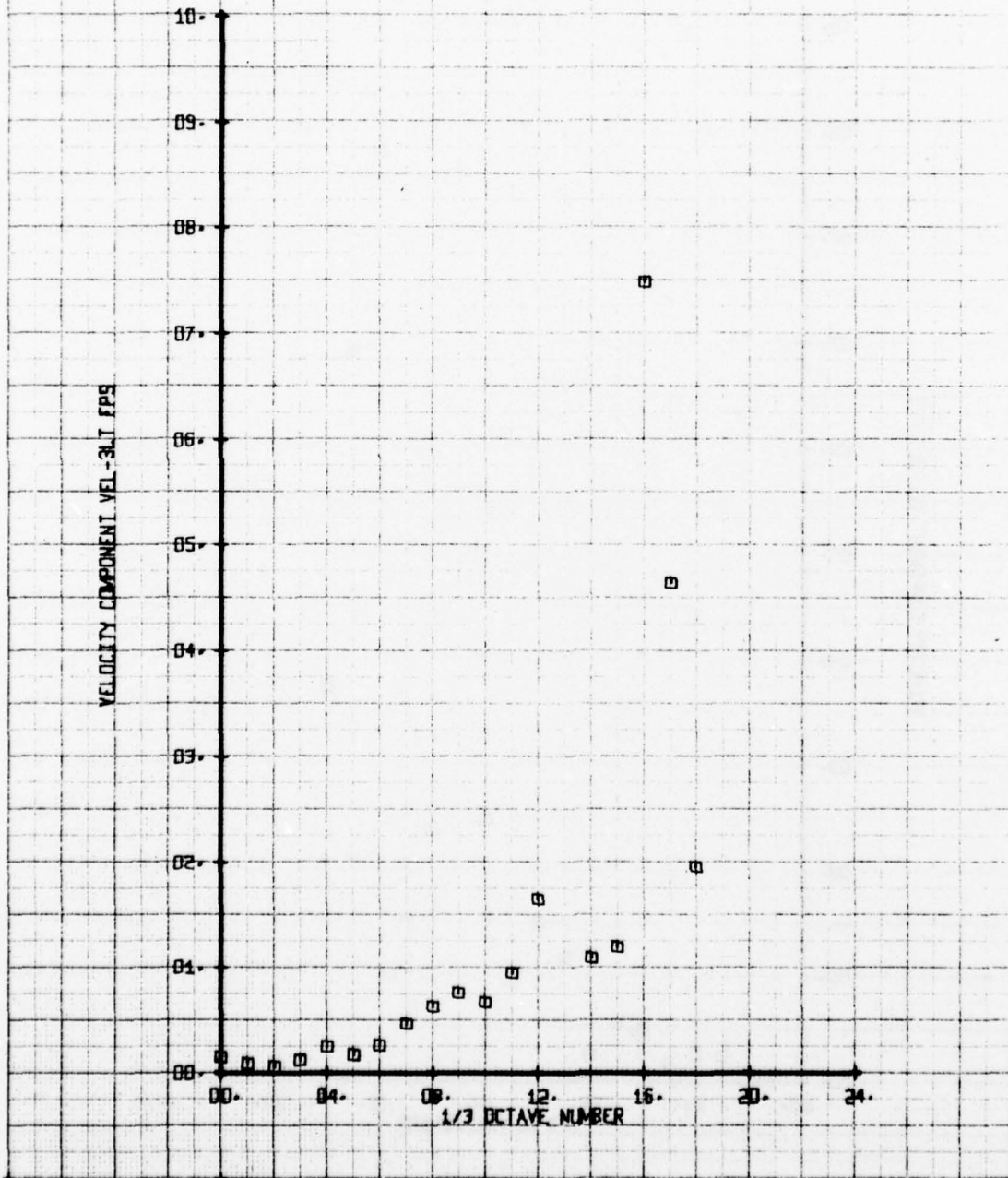
RUN 150 TP 8

SYM
□

CH
70

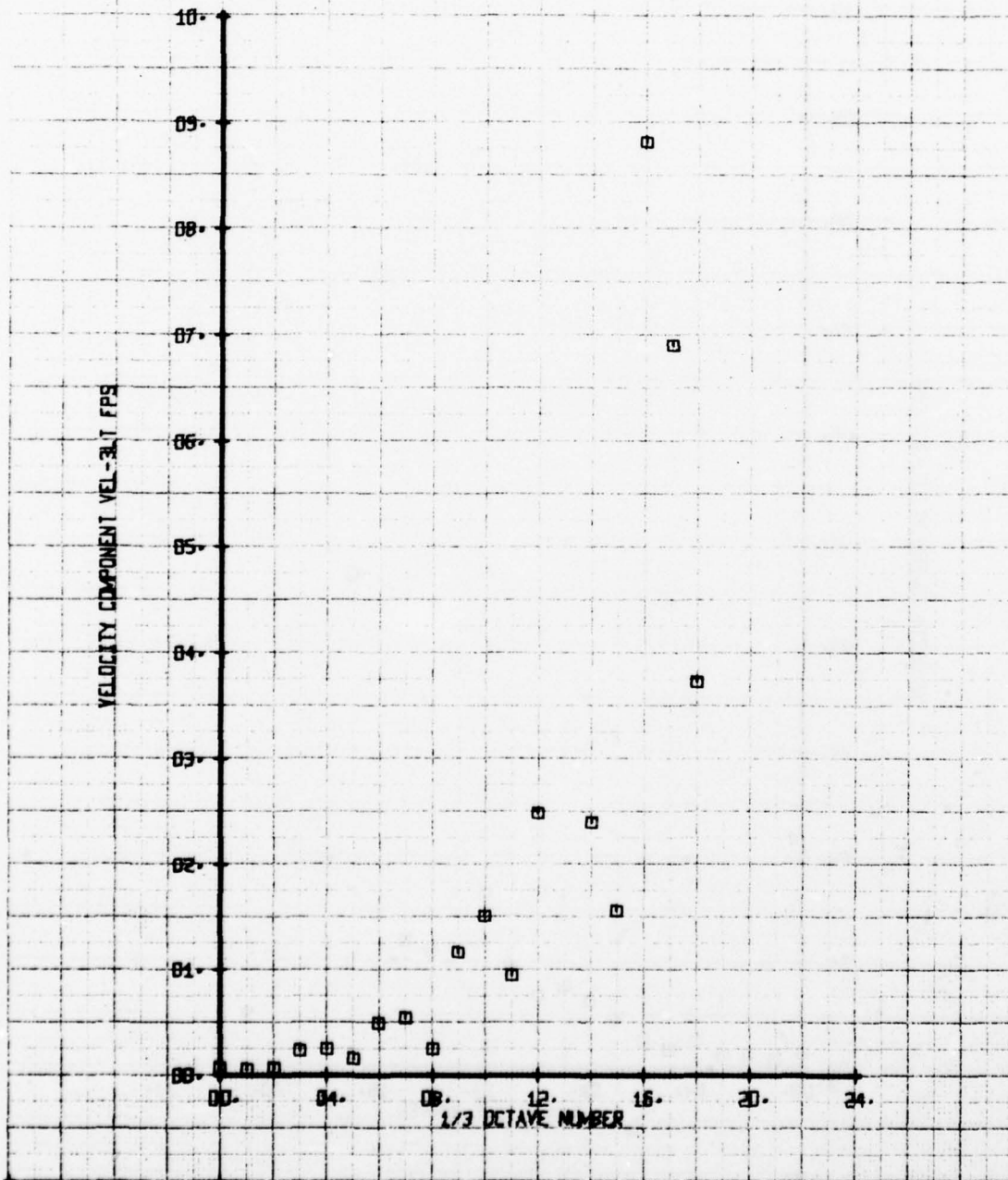
LEGEND

PARAMETER
VEL-3LT



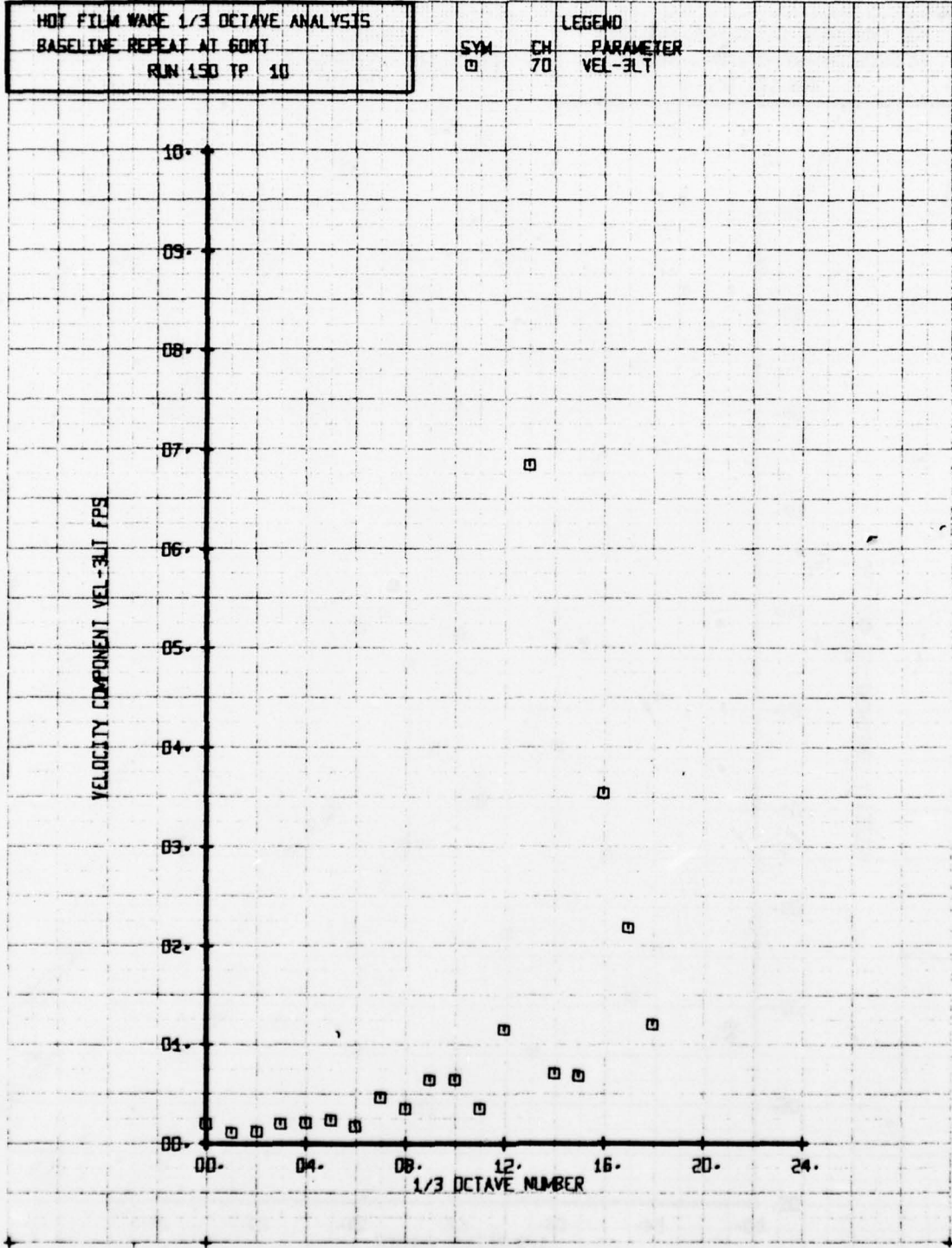
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE REPEAT AT 60KT
RUN 150 TP 9

SYN CH PARAMETER
□ 70 VEL-3LT



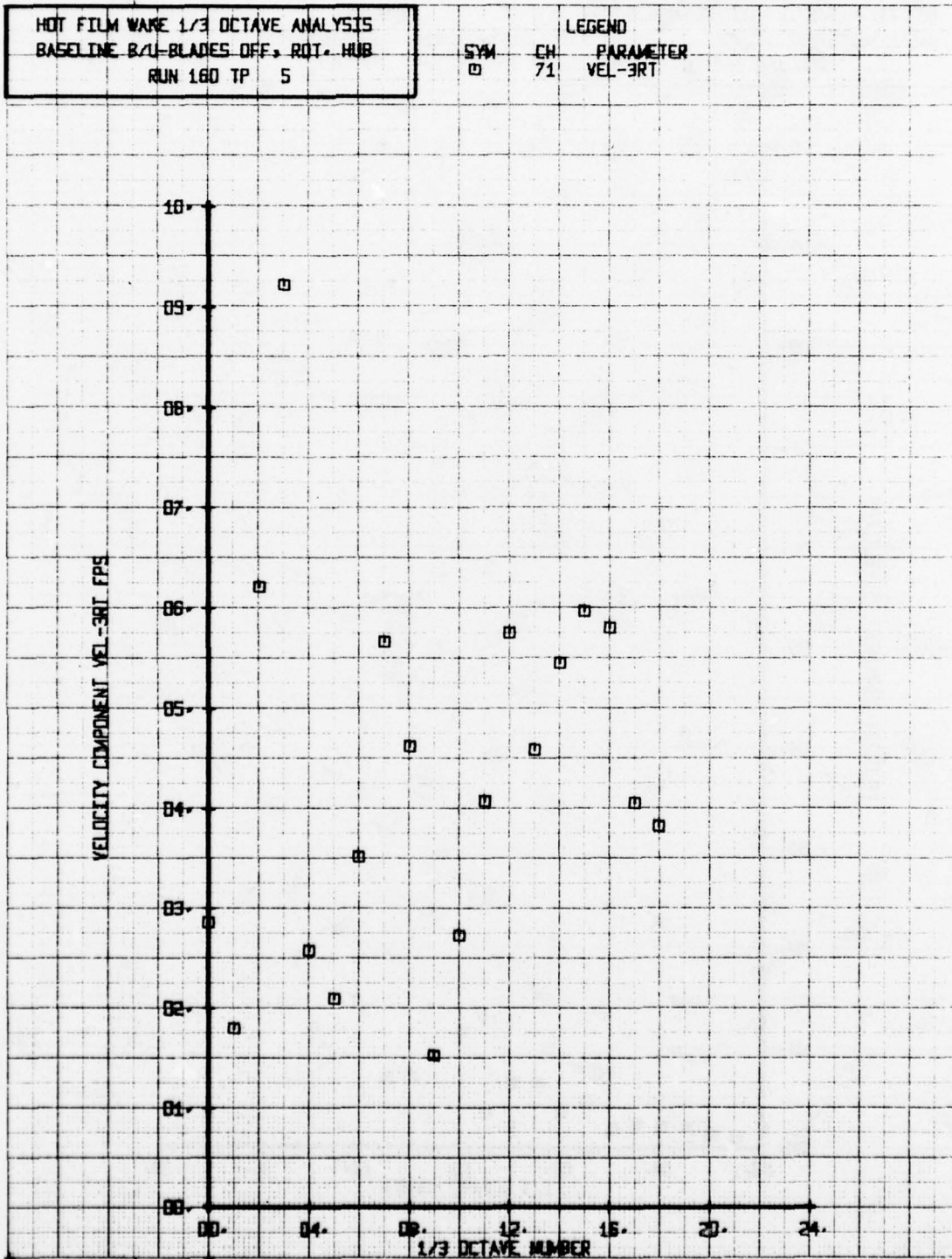
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE REPEAT AT 60MT
 RUN 150 TP 10

SYM	CH	PARAMETER
□	70	VEL-3LT



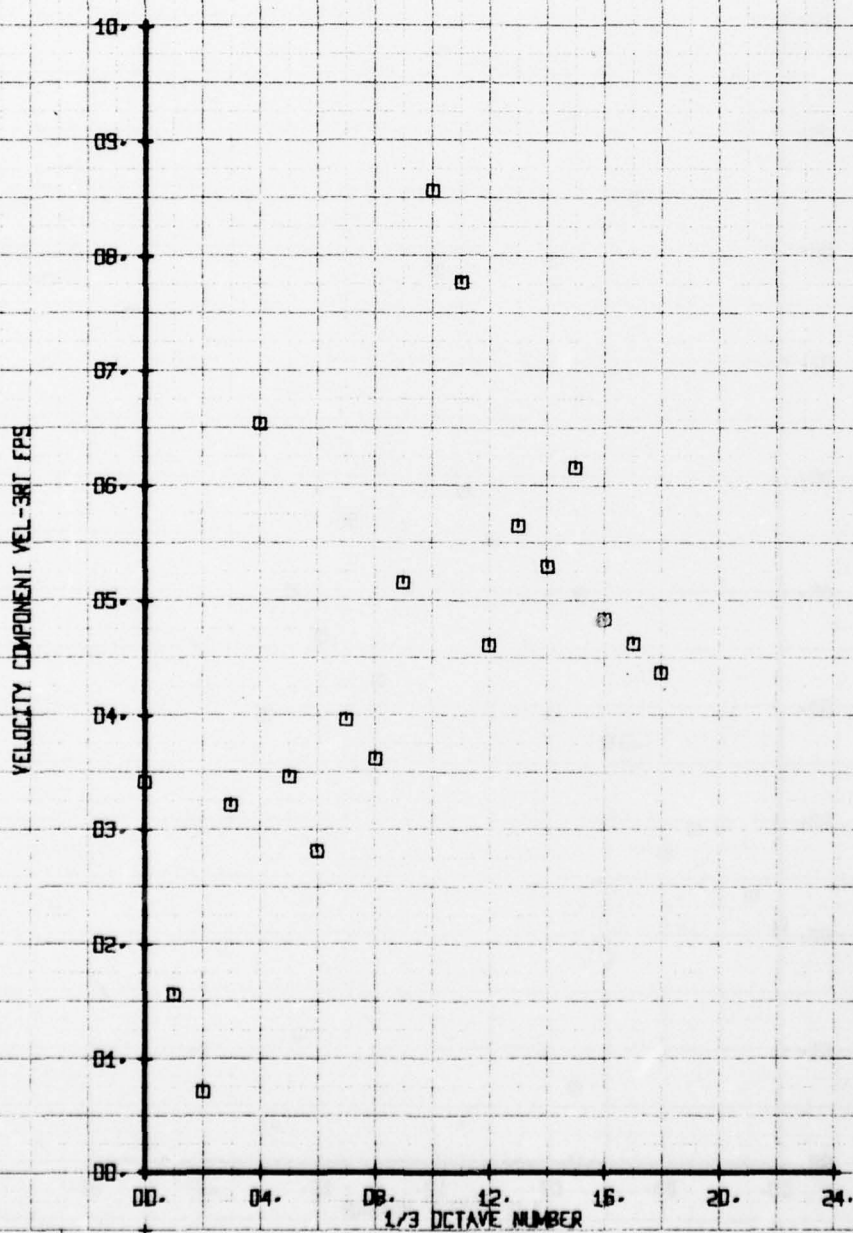
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT, HUB
RUN 160 TP 5

SYM CH PARAMETER
□ 71 VEL-3RT



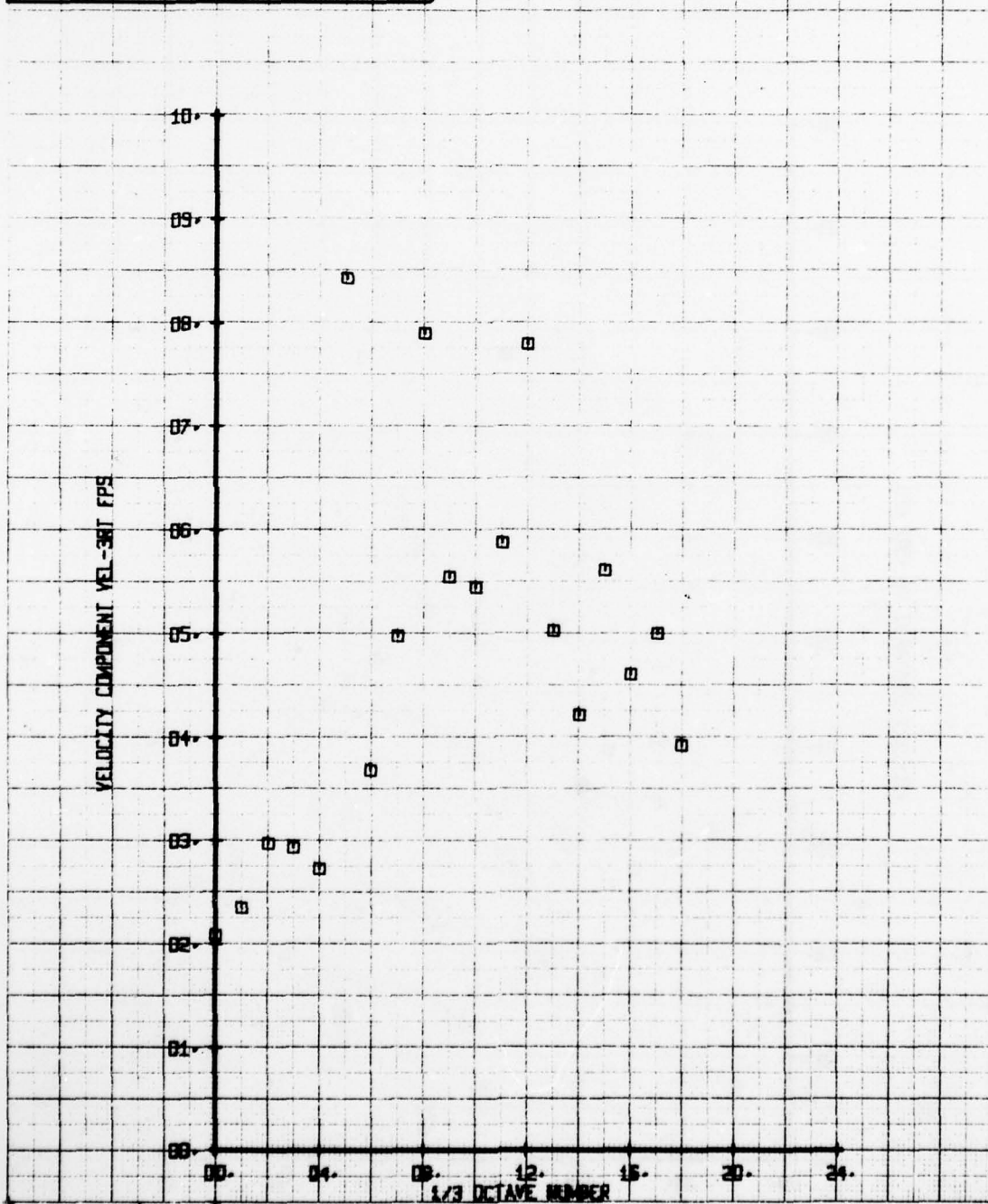
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 6

SYM	CH	PARAMETER
□	71	VEL-3RT



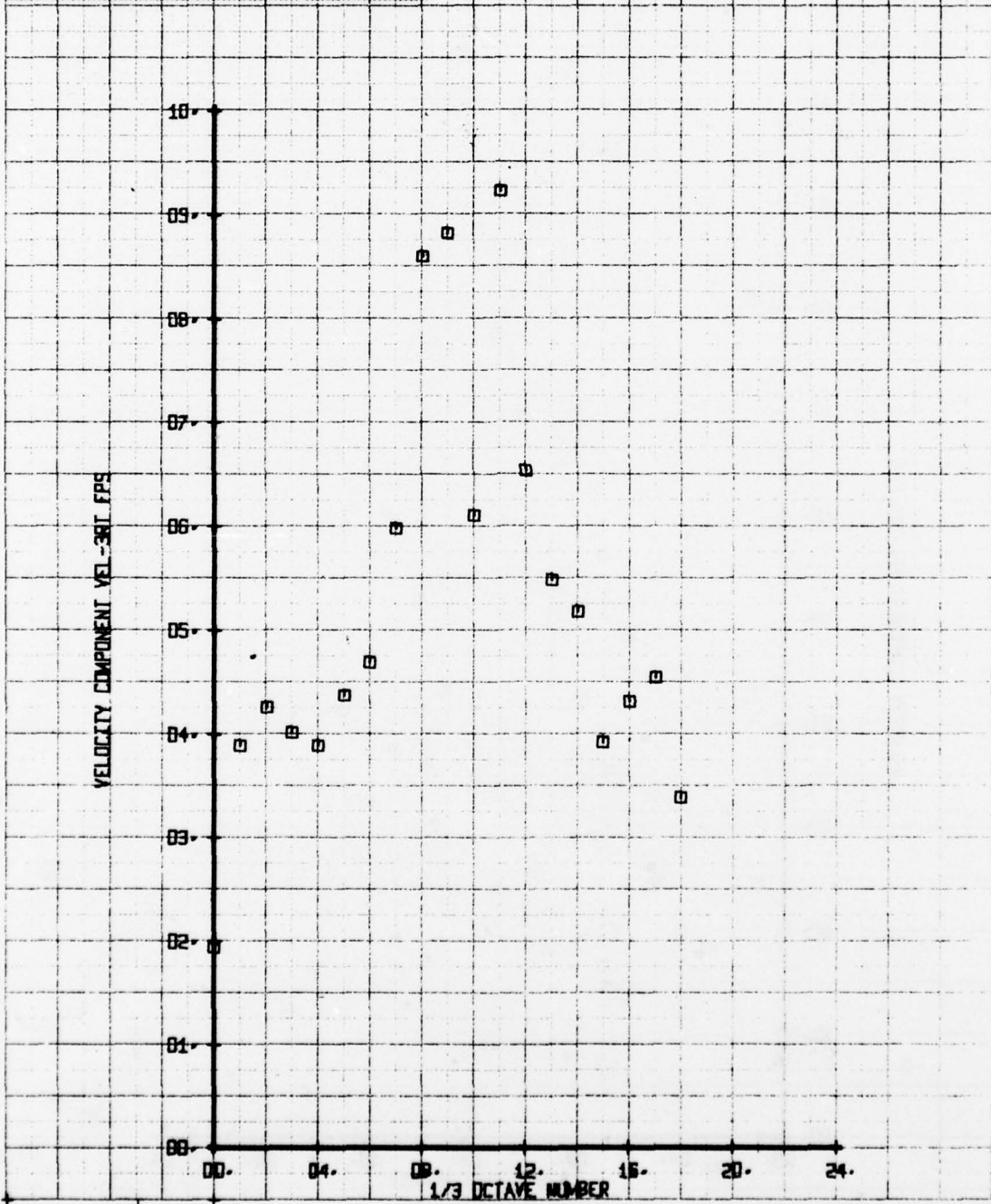
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/U-BLADES OFF, ROT. HUB
 RUN 160 TP 7

LEGEND
 CH: PARAMETER
 71 VEL-3RT



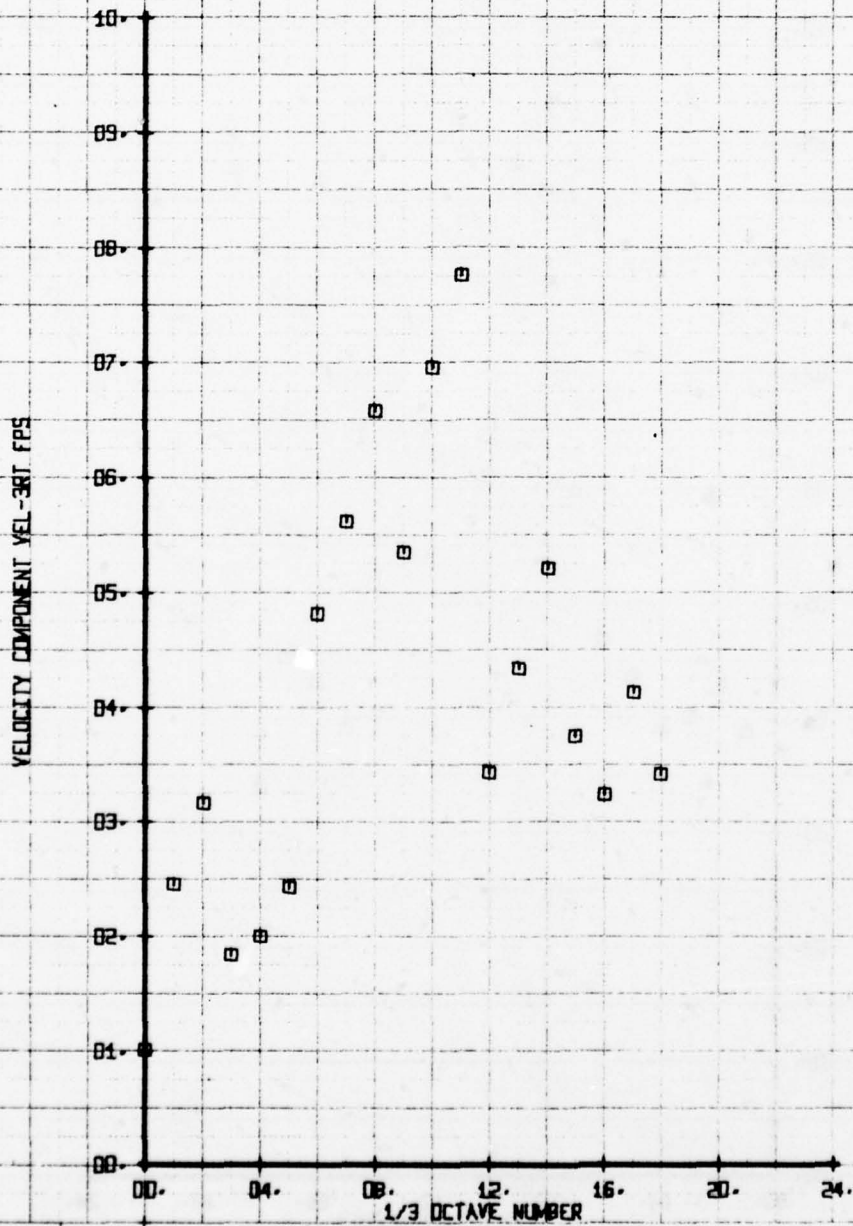
HOT FILM WIRE 1/3 OCTAVE ANALYSIS
 BASELINE R/L-BLADES OFF, ROT. HUB
 RUN 160 TP 8

SYN CH PARAMETER
 □ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/1-BLADES OFF, ROT. HUB
RUN 160 TP 9

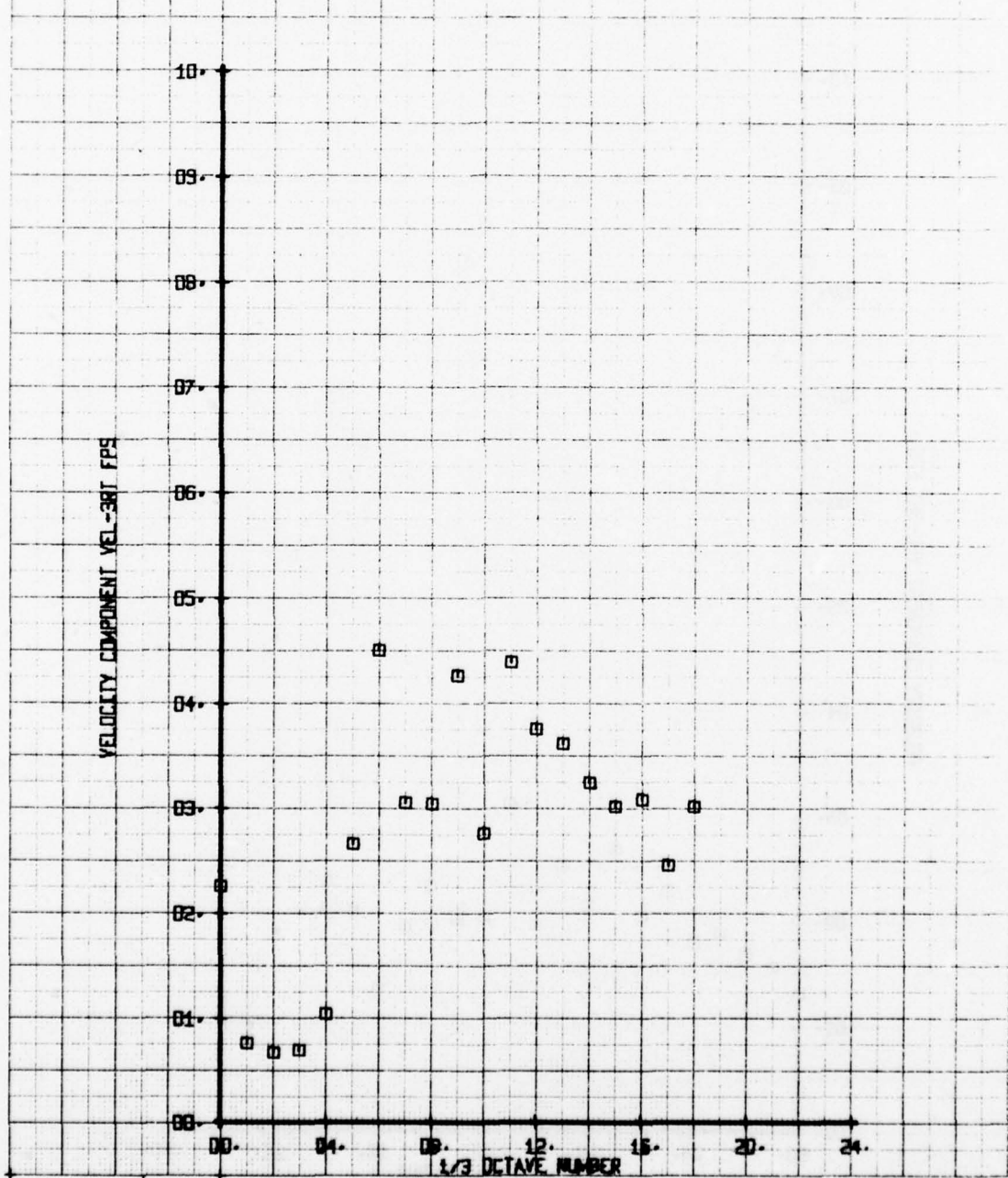
SYN CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/1-BLADES OFF, ROT. HUB
RUN 160 TP 10

SYM
□

LEGEND
CH: 71
PARAMETER
VEL-3RT



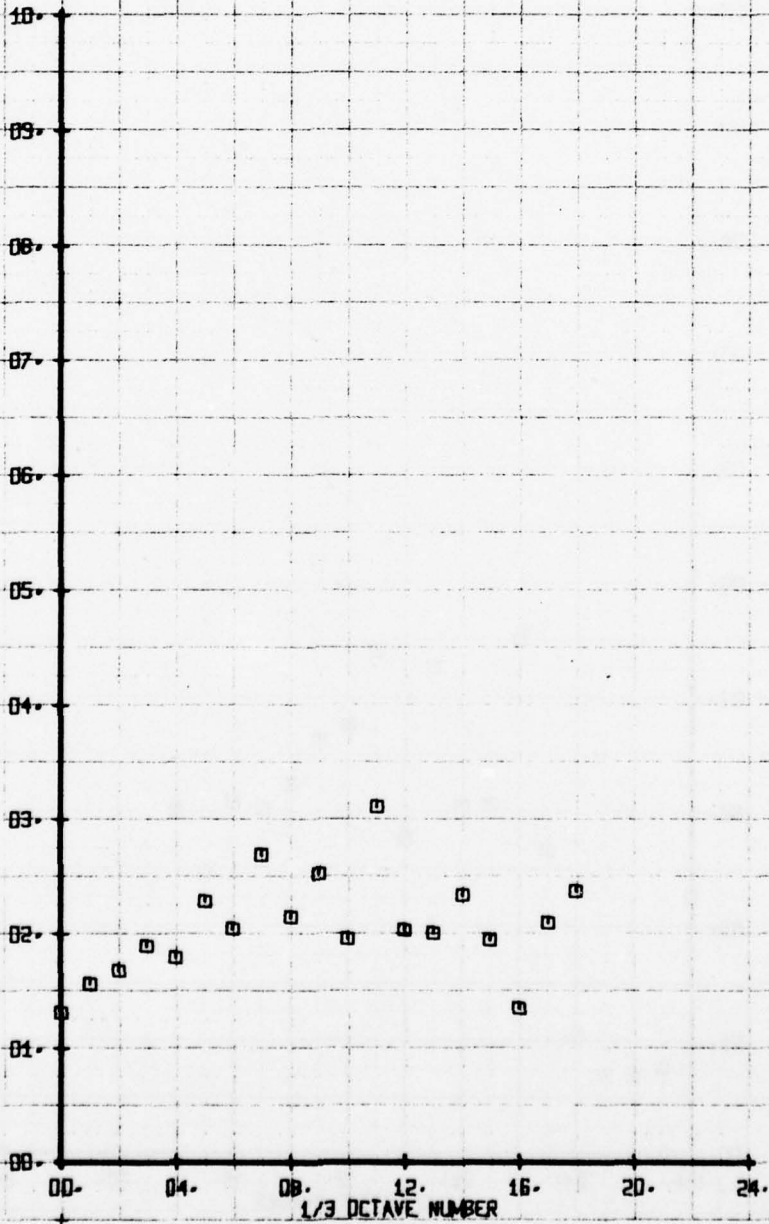
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT. HUB
RUN 160 TP 11

SYM
□

CH
71

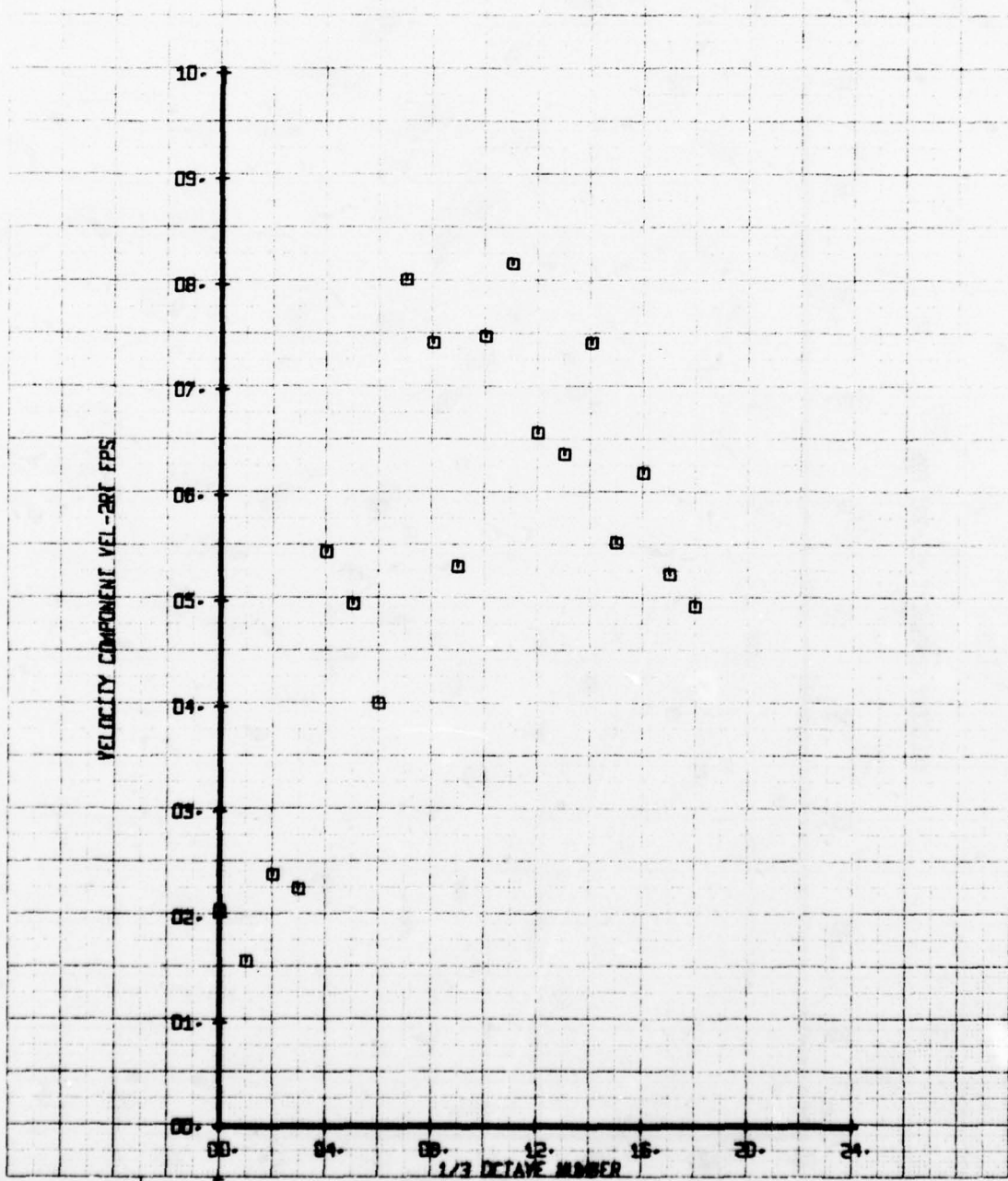
LEGEND
PARAMETER
VEL-3RT

VELOCITY COMPONENT VEL-3RT FPS



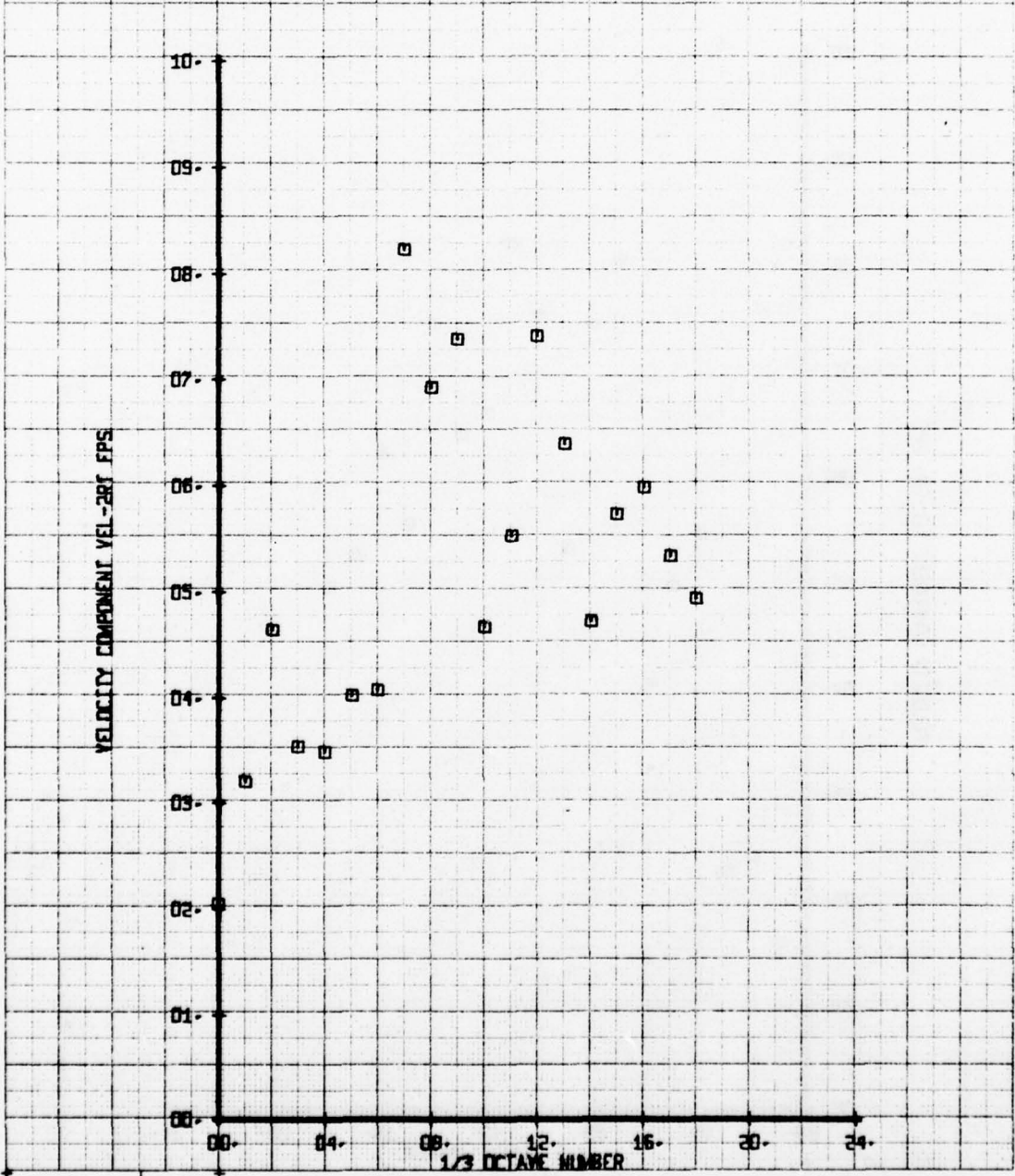
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT- HUB
RUN 180 TP 5

LEGEND
SYM EH PARAMETER
□ 75 VEL-2RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT-HUB
RUN 180 TP 6

LEGEND
SYM CH PARAMETER
□ 75 VEL-2RT

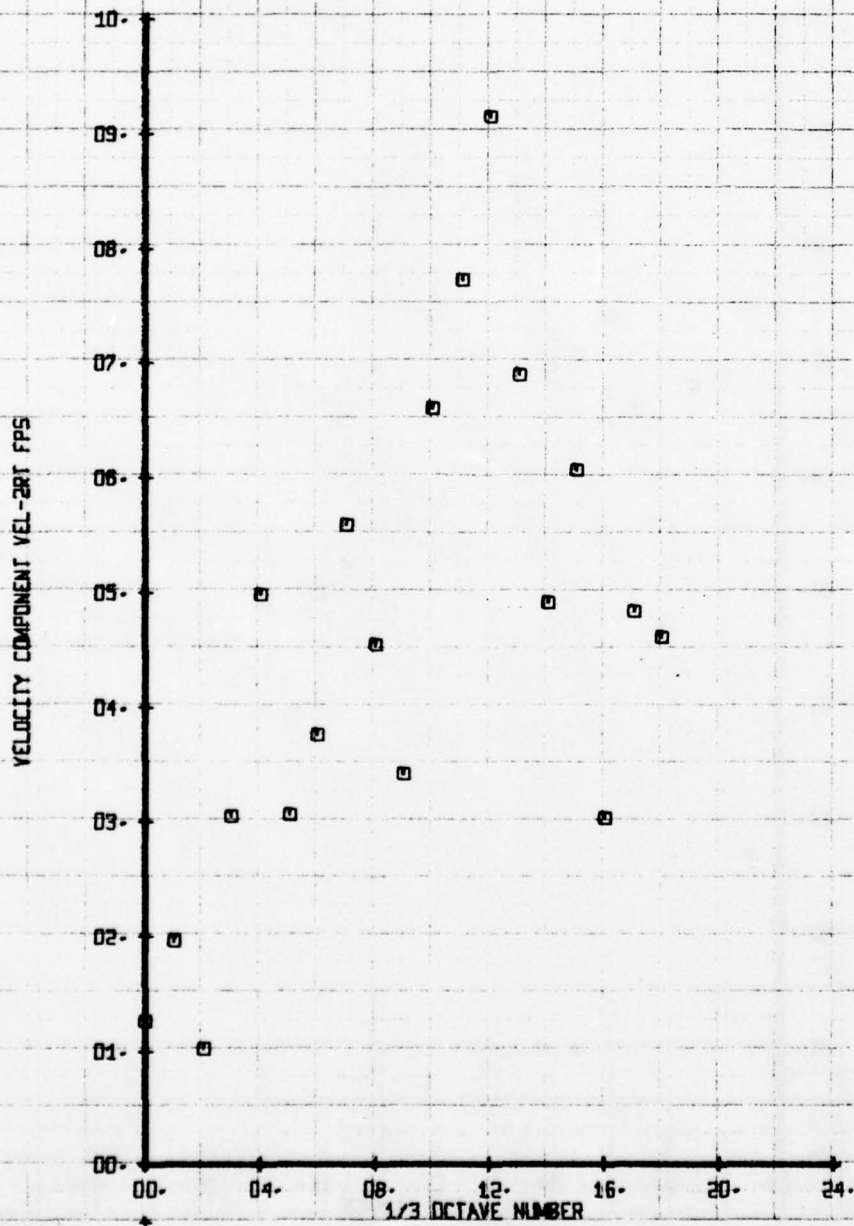


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/4-BLADES OFF, ROT- HUB
RUN 160 TP 7

SYM
□

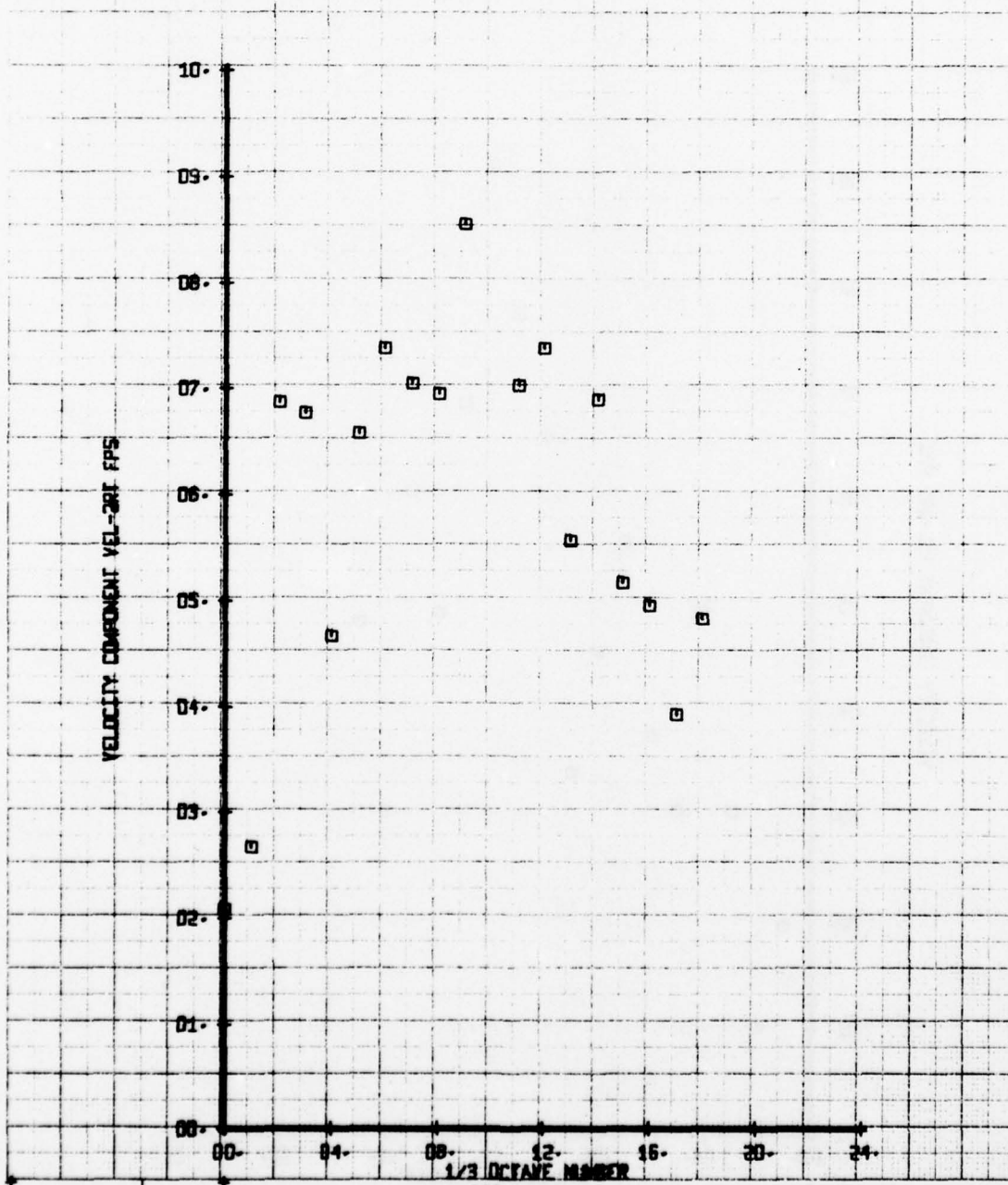
CH
75

LEGEND
PARAMETER
VEL-2RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT. HUB
RUN 160 TP 8

LEGEND
SYM CH PARAMETER
□ 75 VEL-2RT

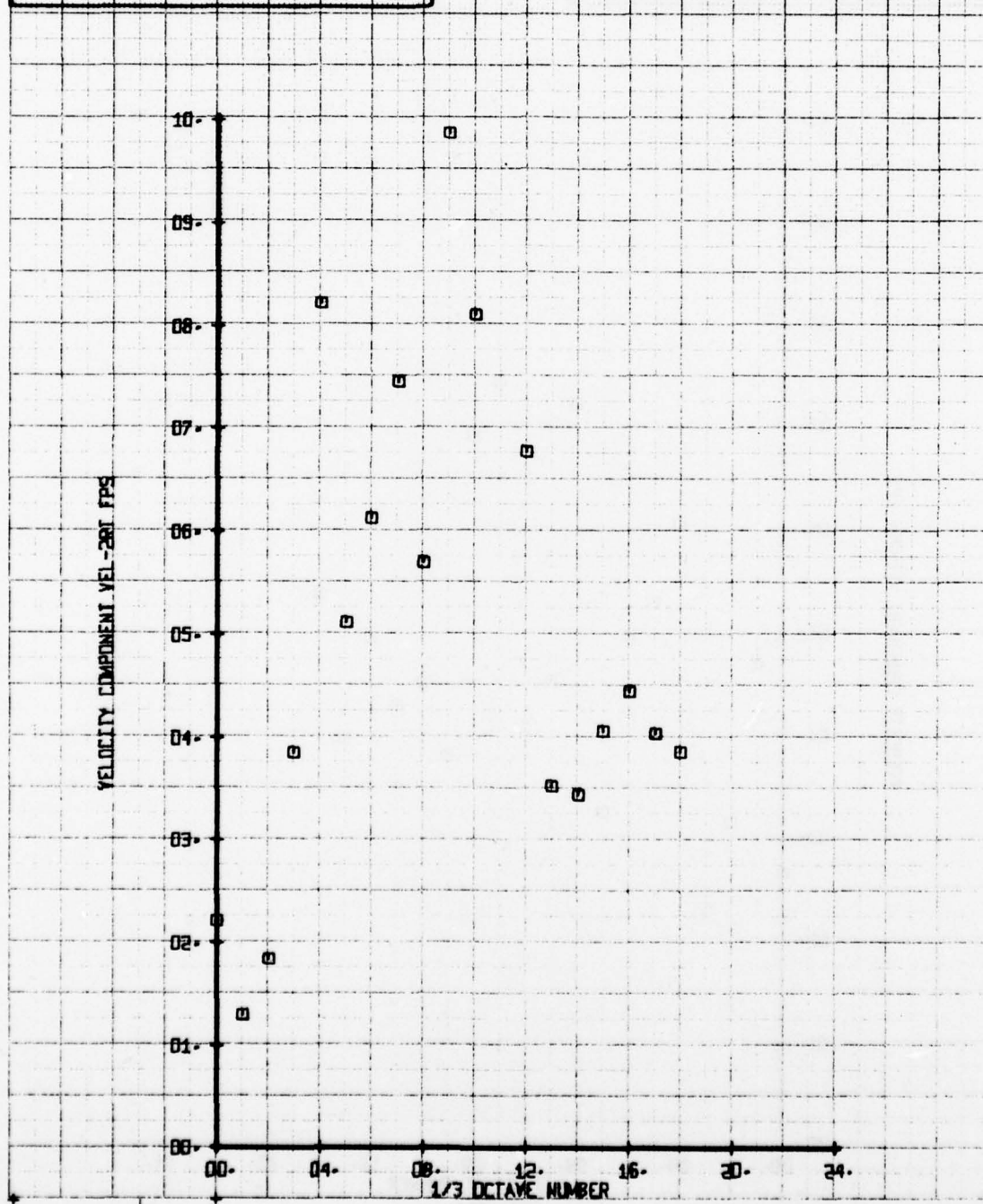


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/L-BLADES OFF, ROT-MHB
RUN 160 TP B

SYM
□

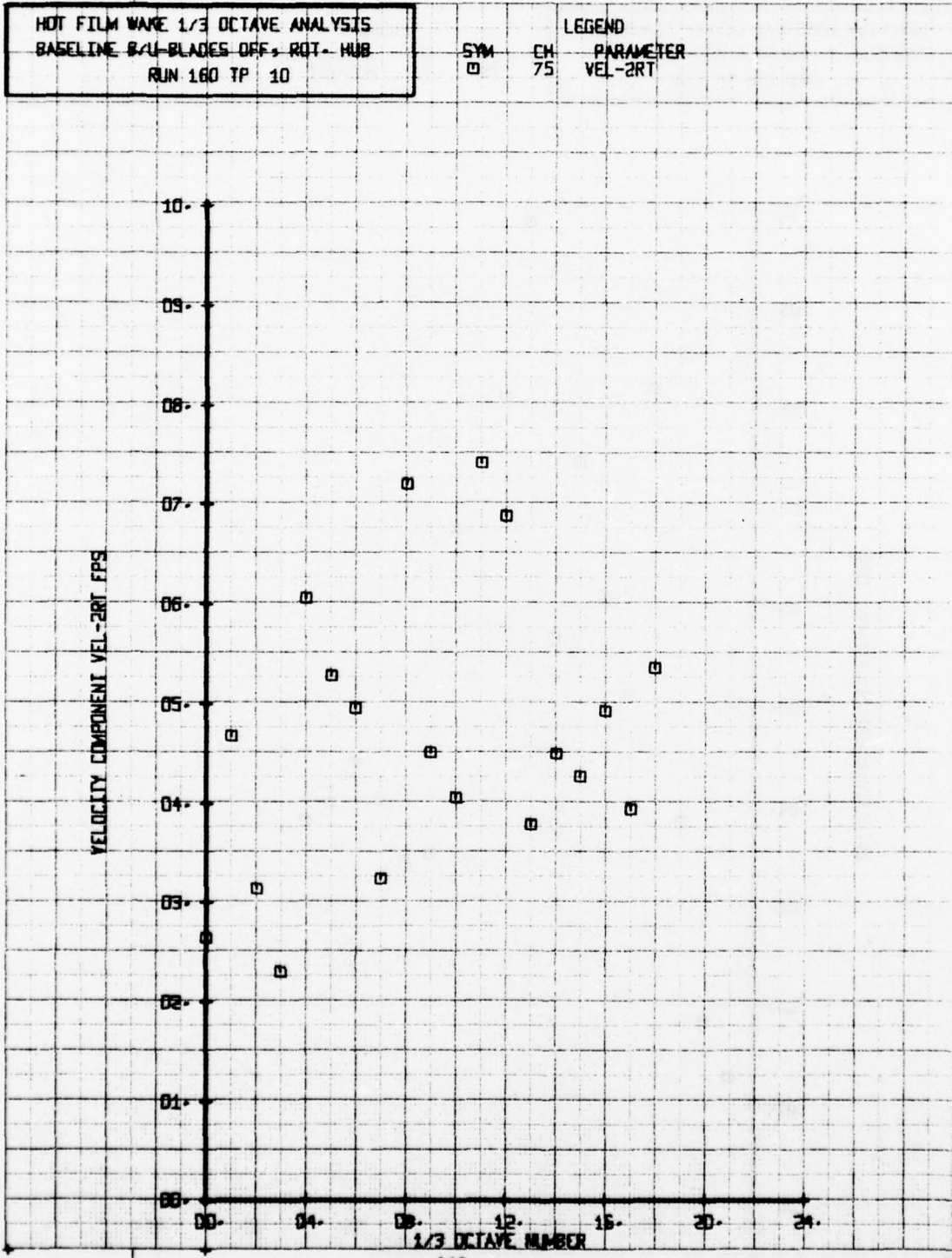
CH
75

LEGEND
PARAMETER
VEL-2RT



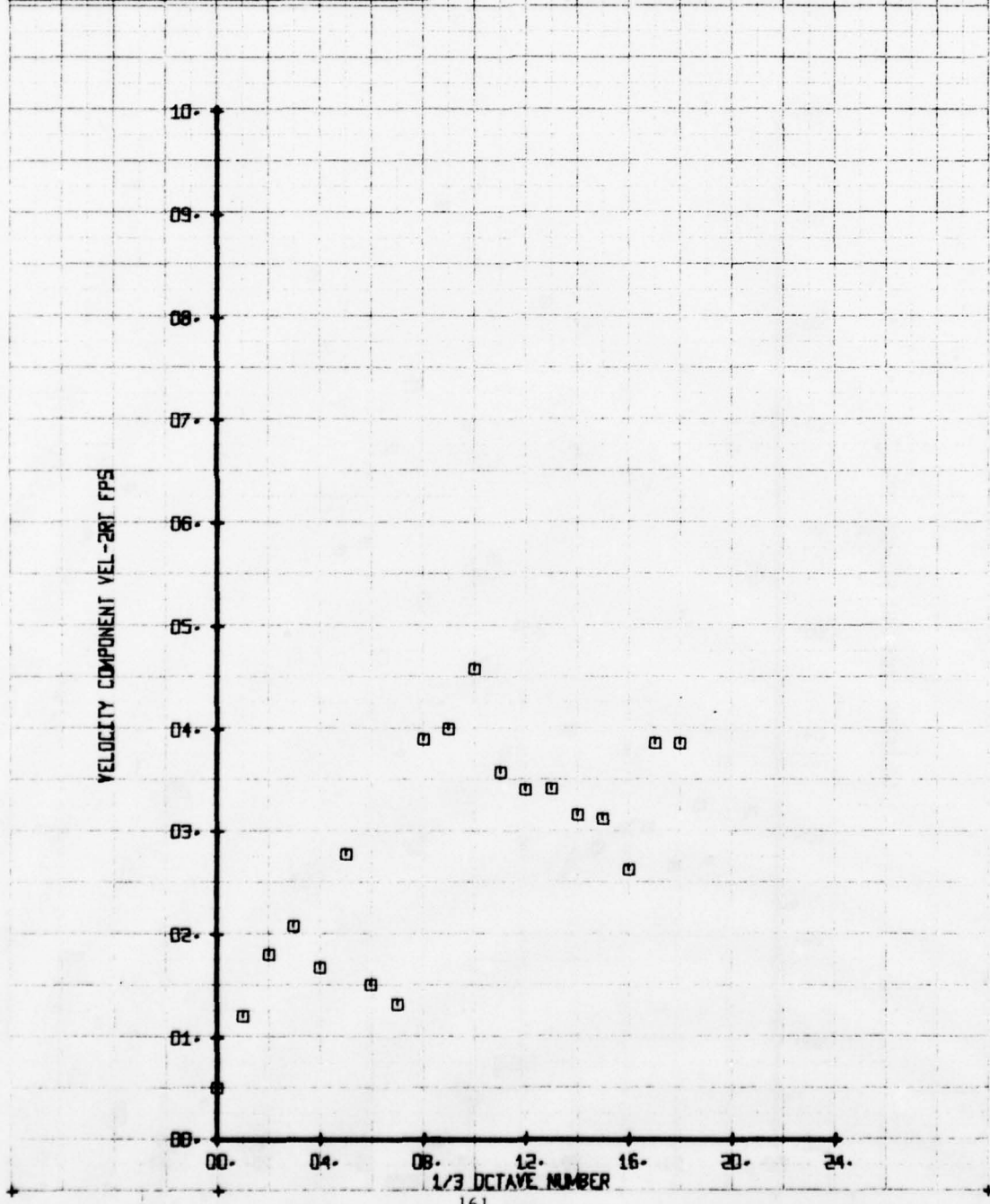
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT-HUB
 RUN 160 TP 10

SYN CH PARAMETER
 □ 75 VEL-2RT



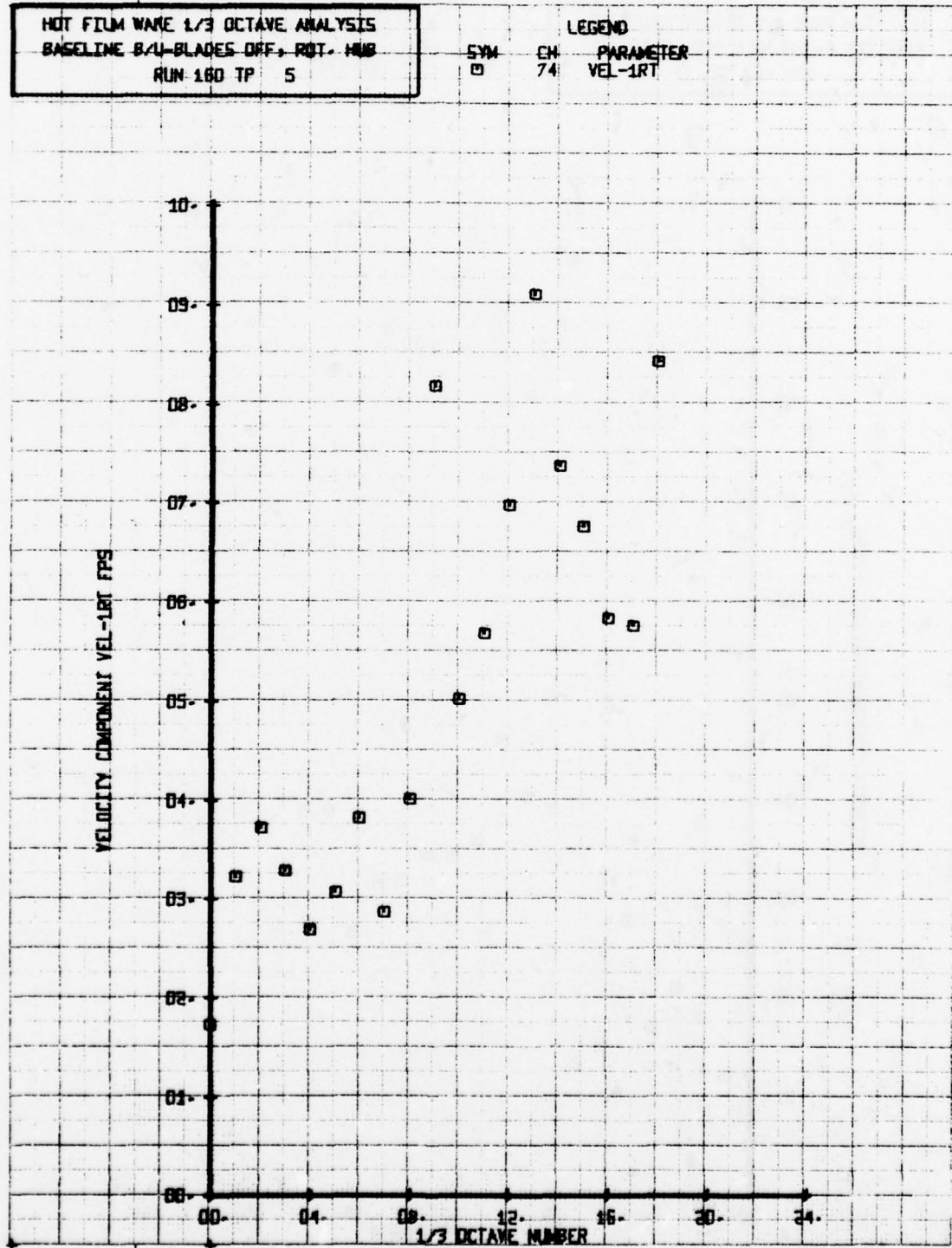
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/1-BLADES OFF, ROT-HUB
 RUN 160 TP 11

SYM	CH	LEGEND	PARAMETER
□	75		VEL-2RT



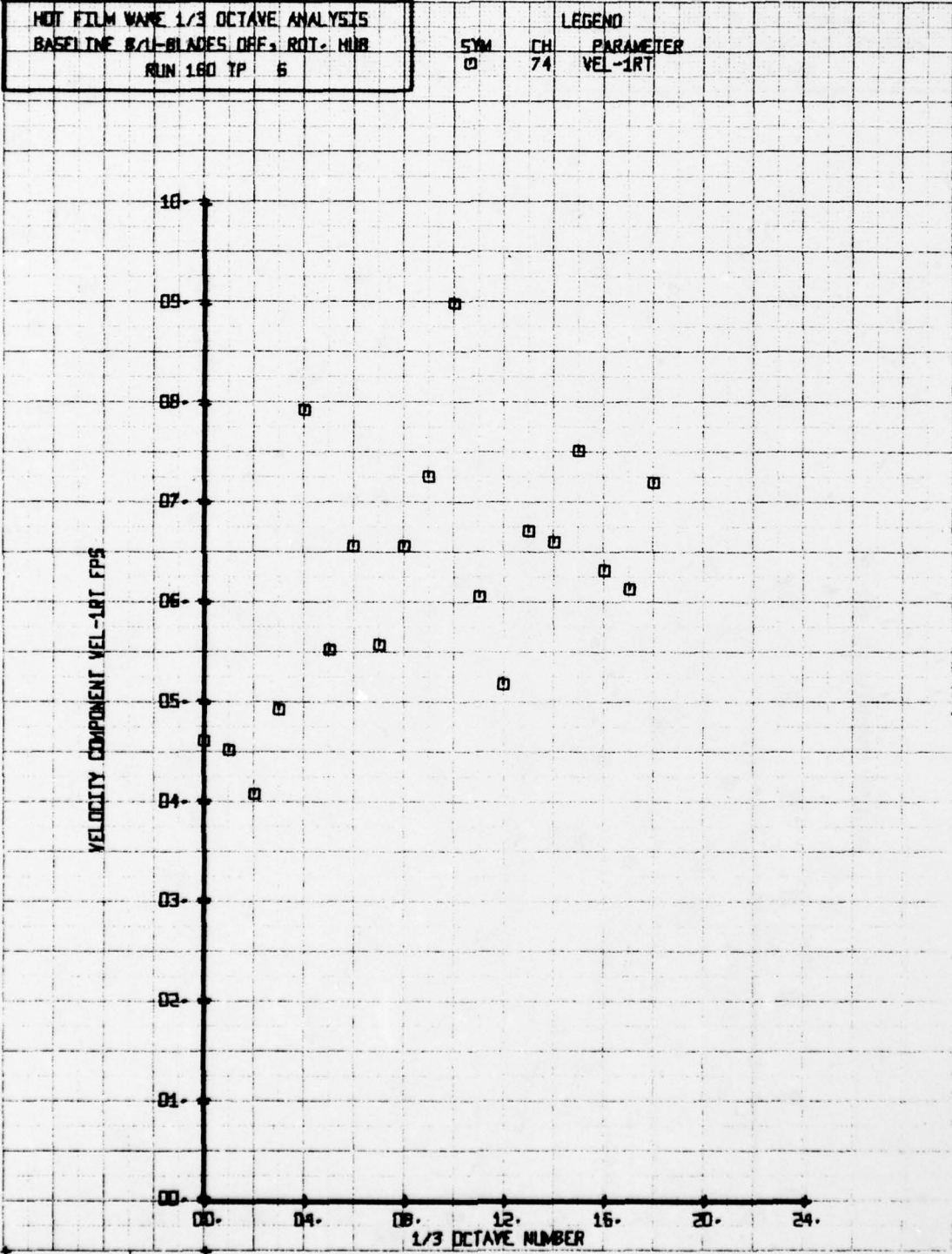
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/4-BLADES OFF, ROT. HUB
RUN 160 TP 5

LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



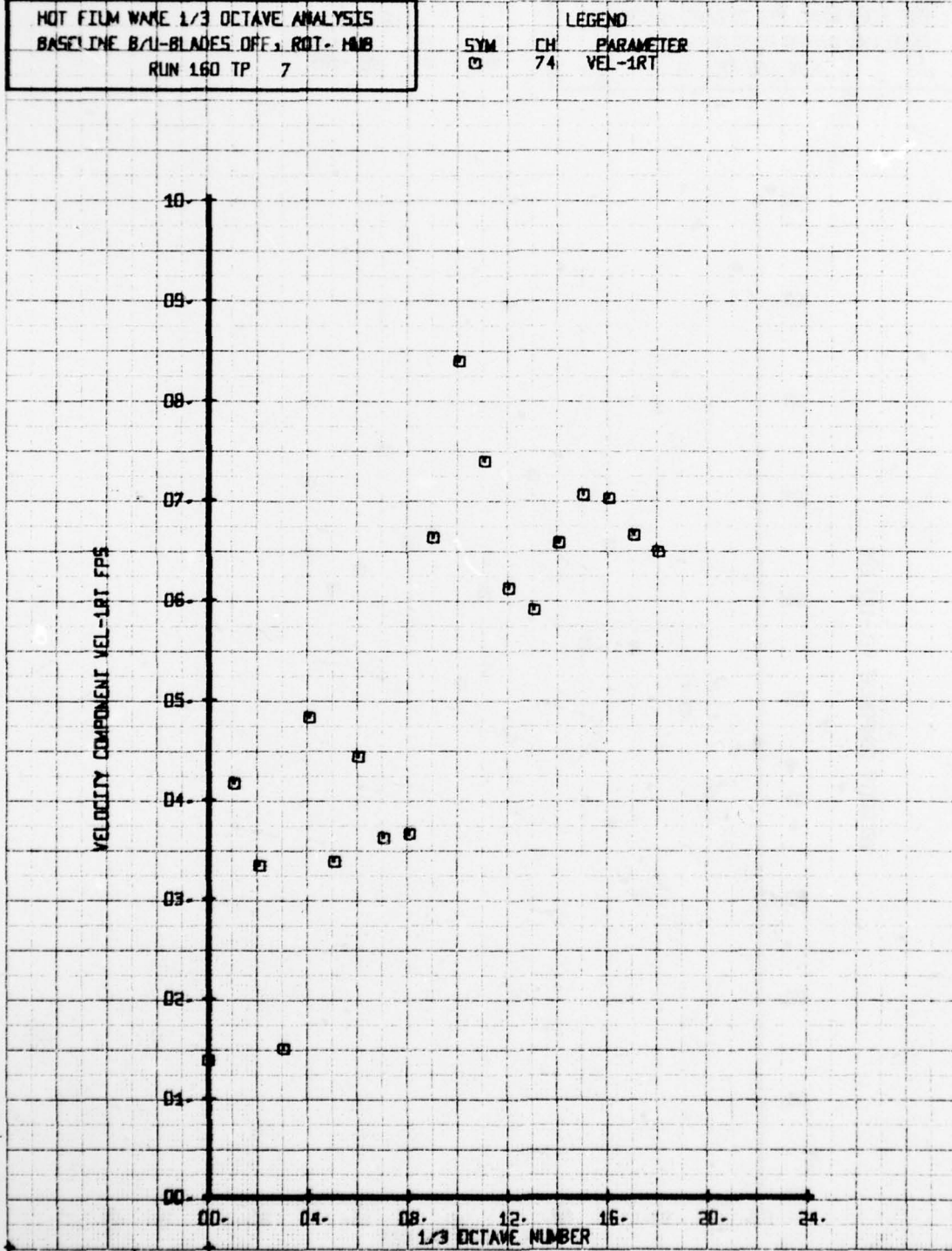
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE 8/1-BLADES DRF, ROT. MUR
 RUN 160 TP 6

SYM	CH	PARAMETER
□	74	VEL-1RT



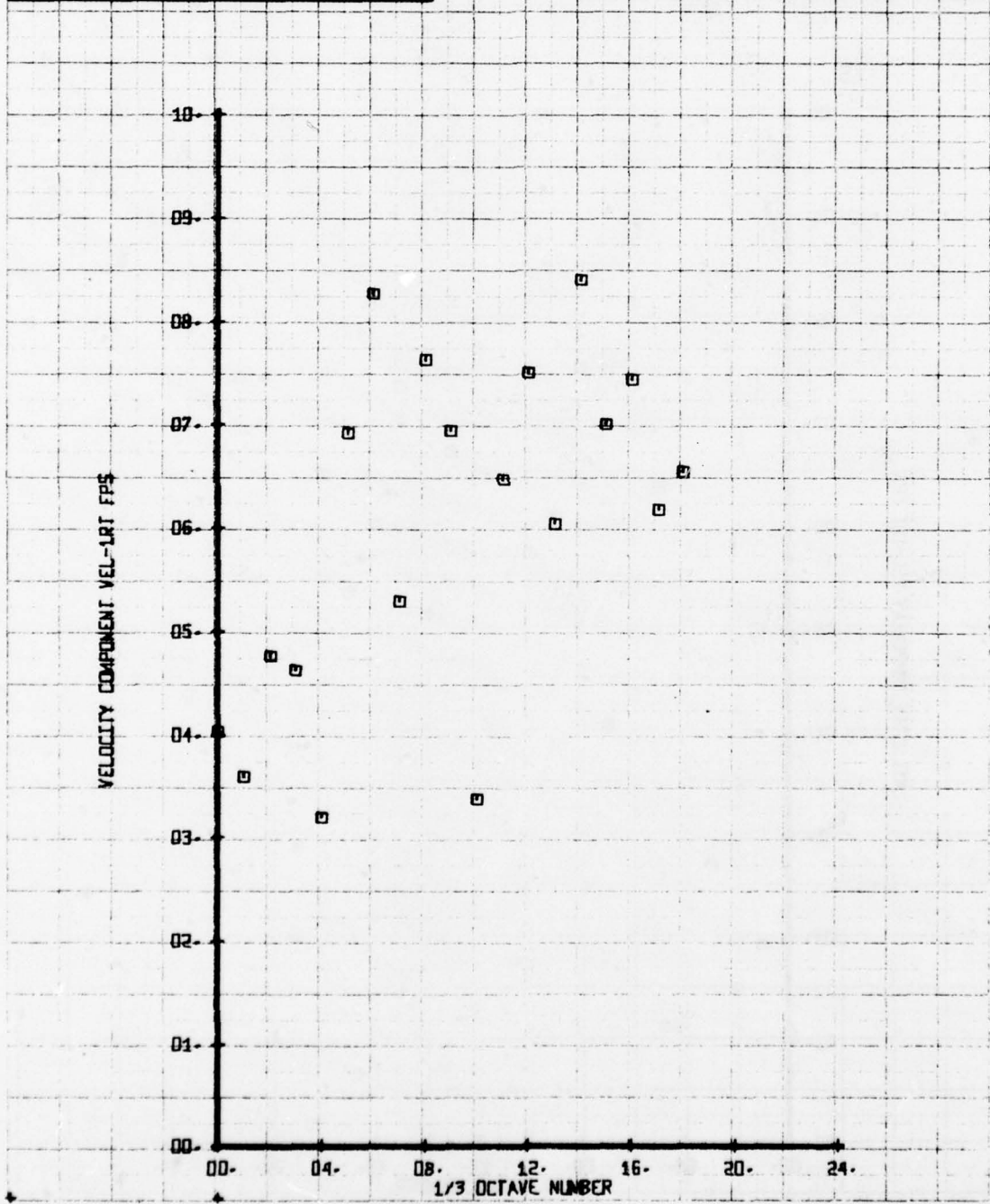
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT - MMB
RUN 160 TP 7

LEGEND
SYM CH. PARAMETER
□ 74 VEL-1RT



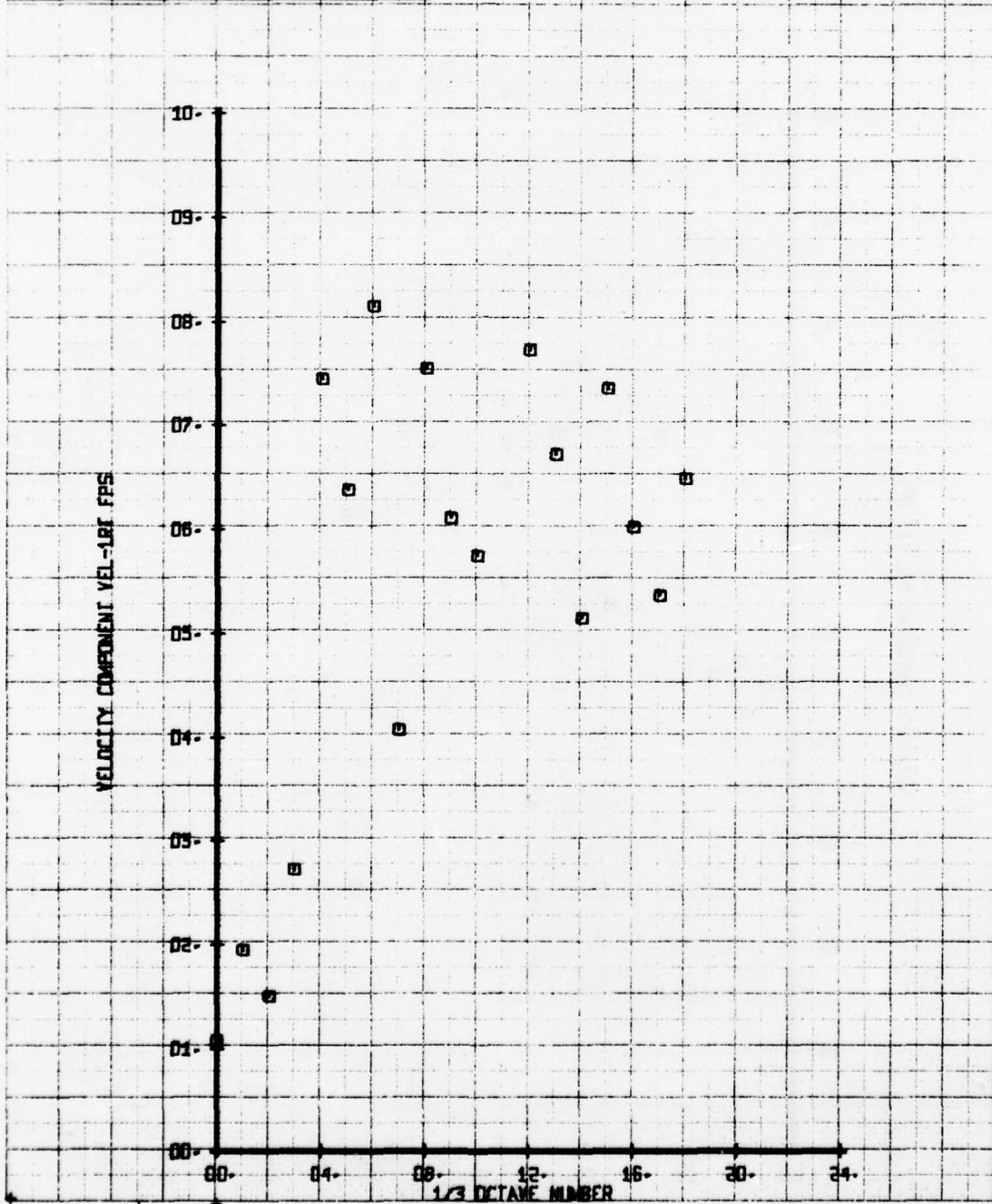
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 BASELINE B/D-BLADES OFF ROT. HUB
 RUN 160 TP B

SYM	CH	PARAMETER
□	74	VEL-1RT



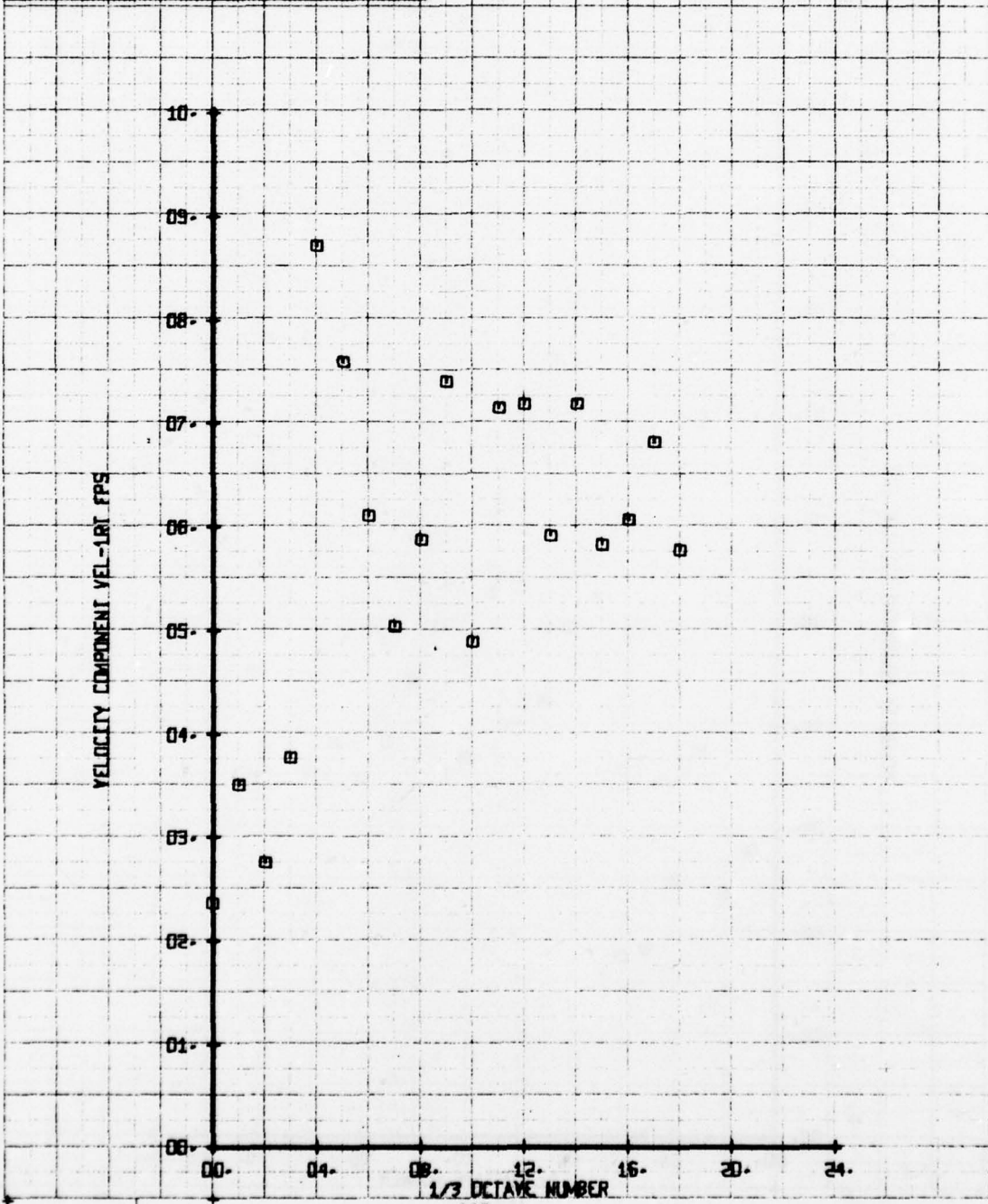
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BASELINE 8/4-BLADES OFF, ROT- MIB
RUN 160 TP 9

SYM CH PARAMETER
□ 74 VEL-1RT



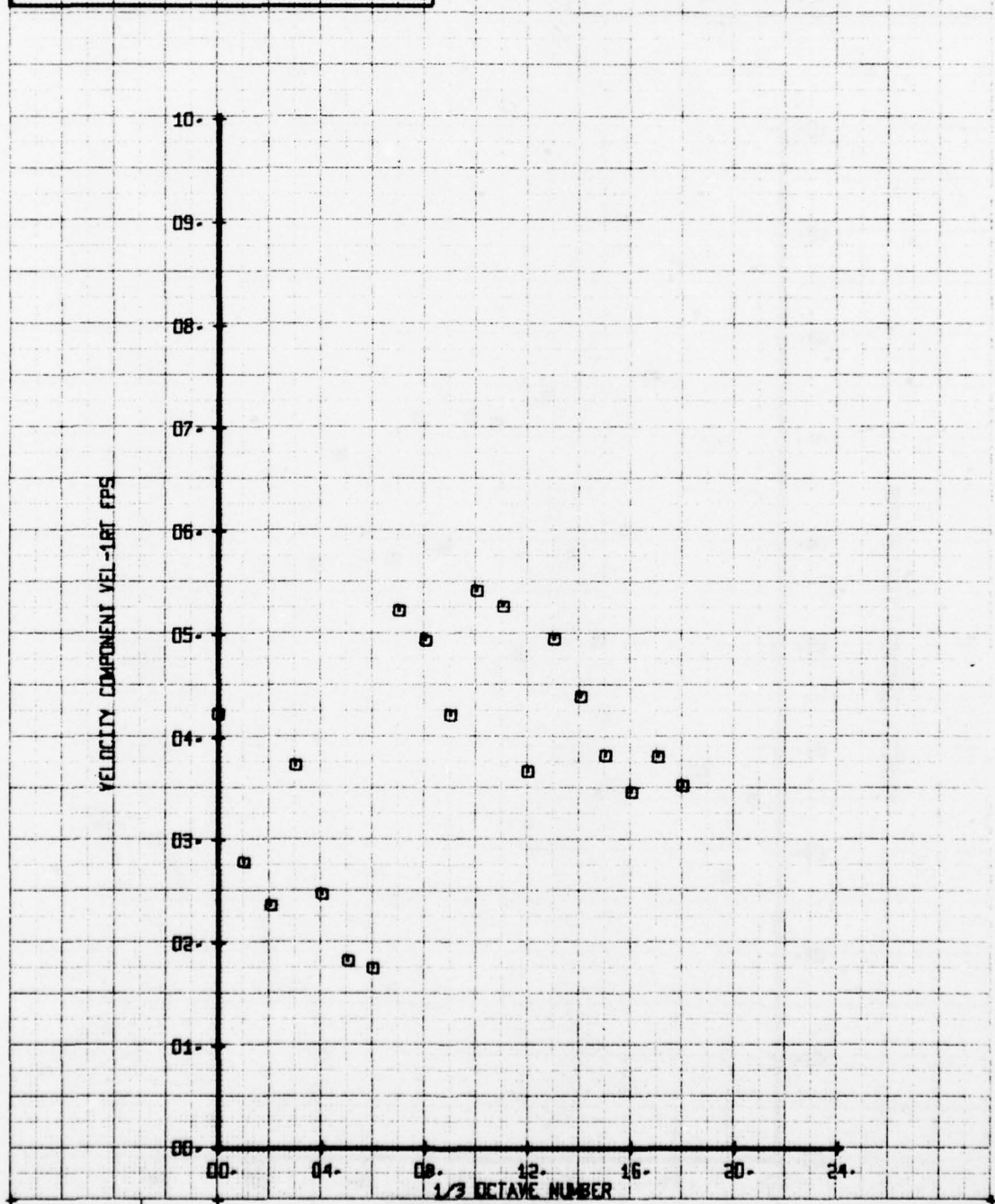
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/1-BLADES OFF, ROT. HUB
 RUN 160 TP 10

LEGEND
 CH 74
 PARAMETER
 VEL-1RT



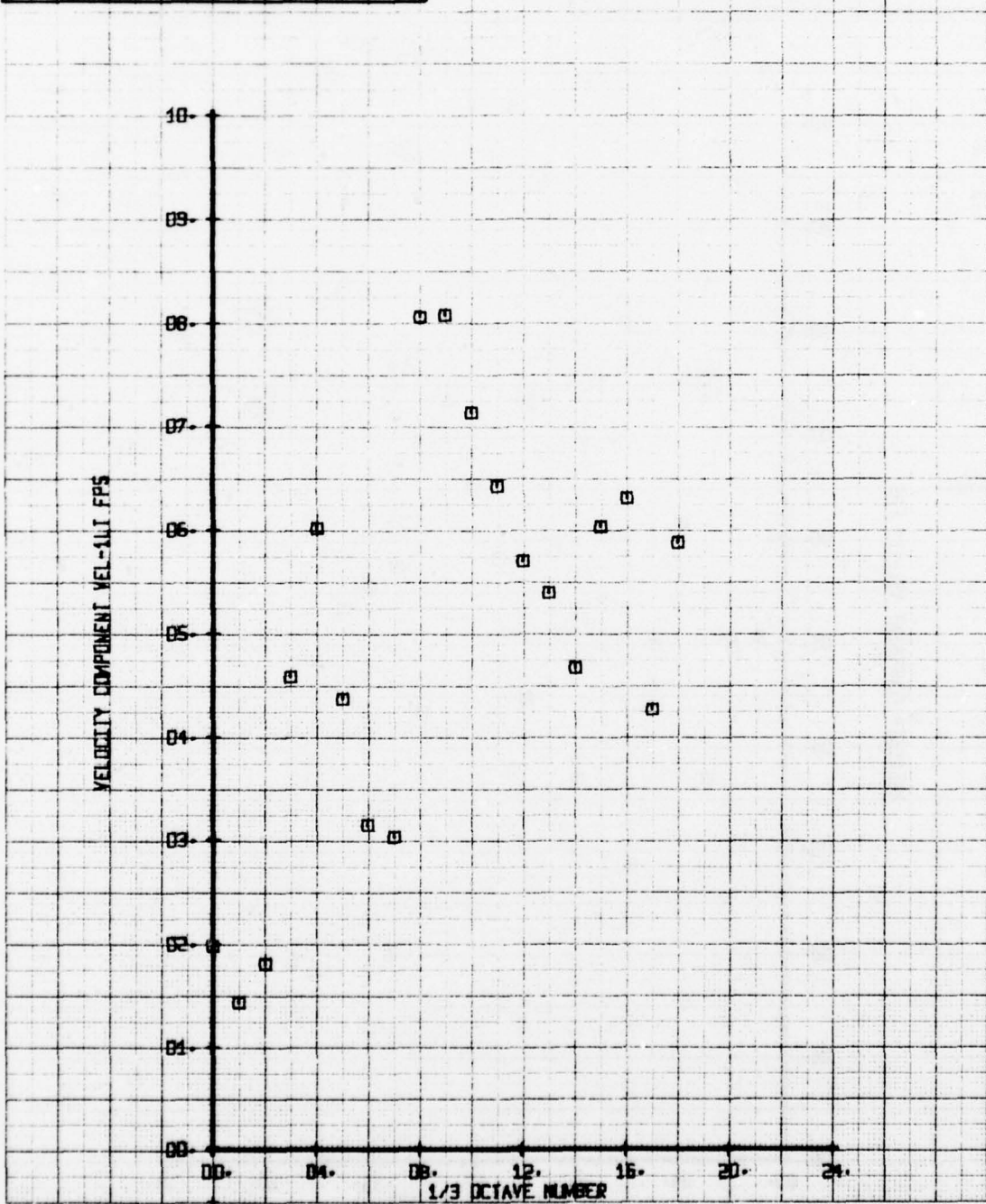
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/4-BLADES OFF, ROT- HUB
RUN 160 TP 11

LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



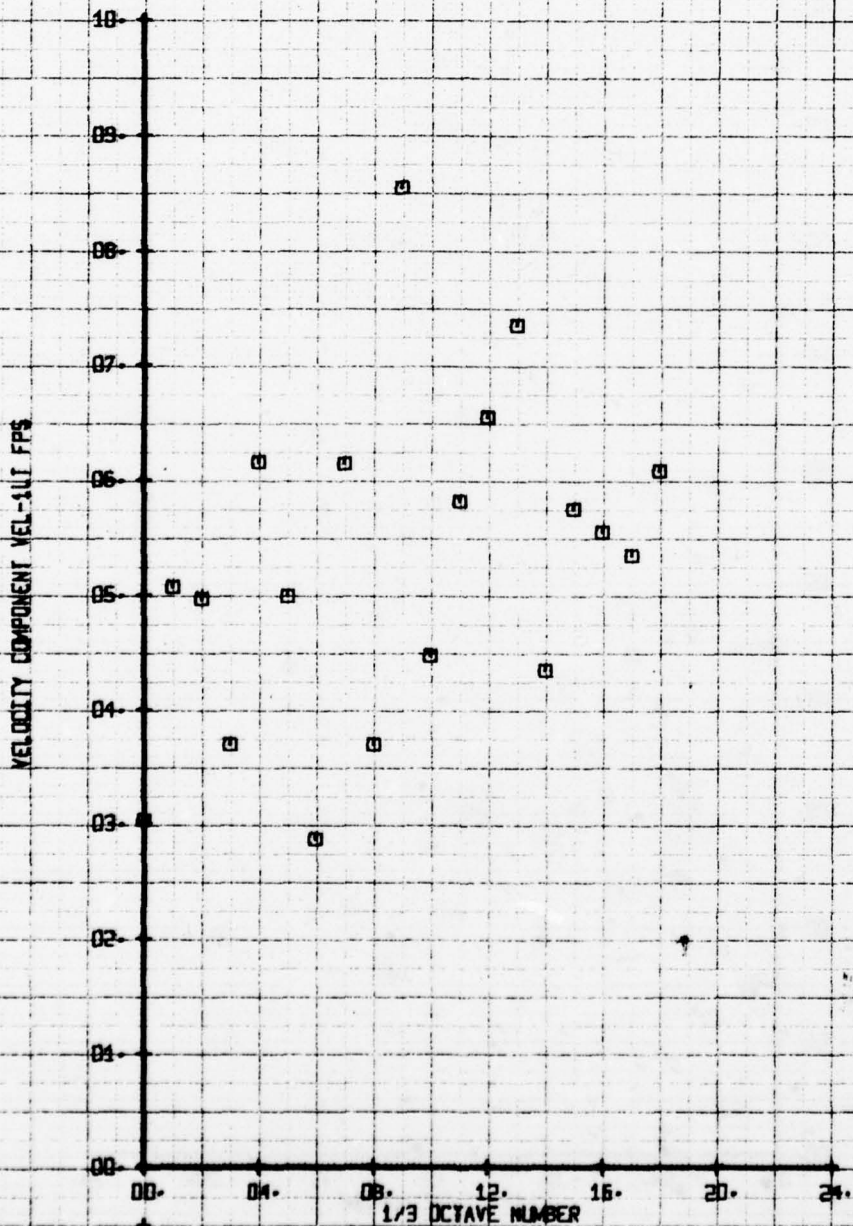
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADDES OFF, ROT. HUB
 RUN 160 TP 6

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/11-BLADES OFF, ROT. HUB
 RUN 160 TP 7

SYM	CH	PARAMETER
□	73	VEL-1LT

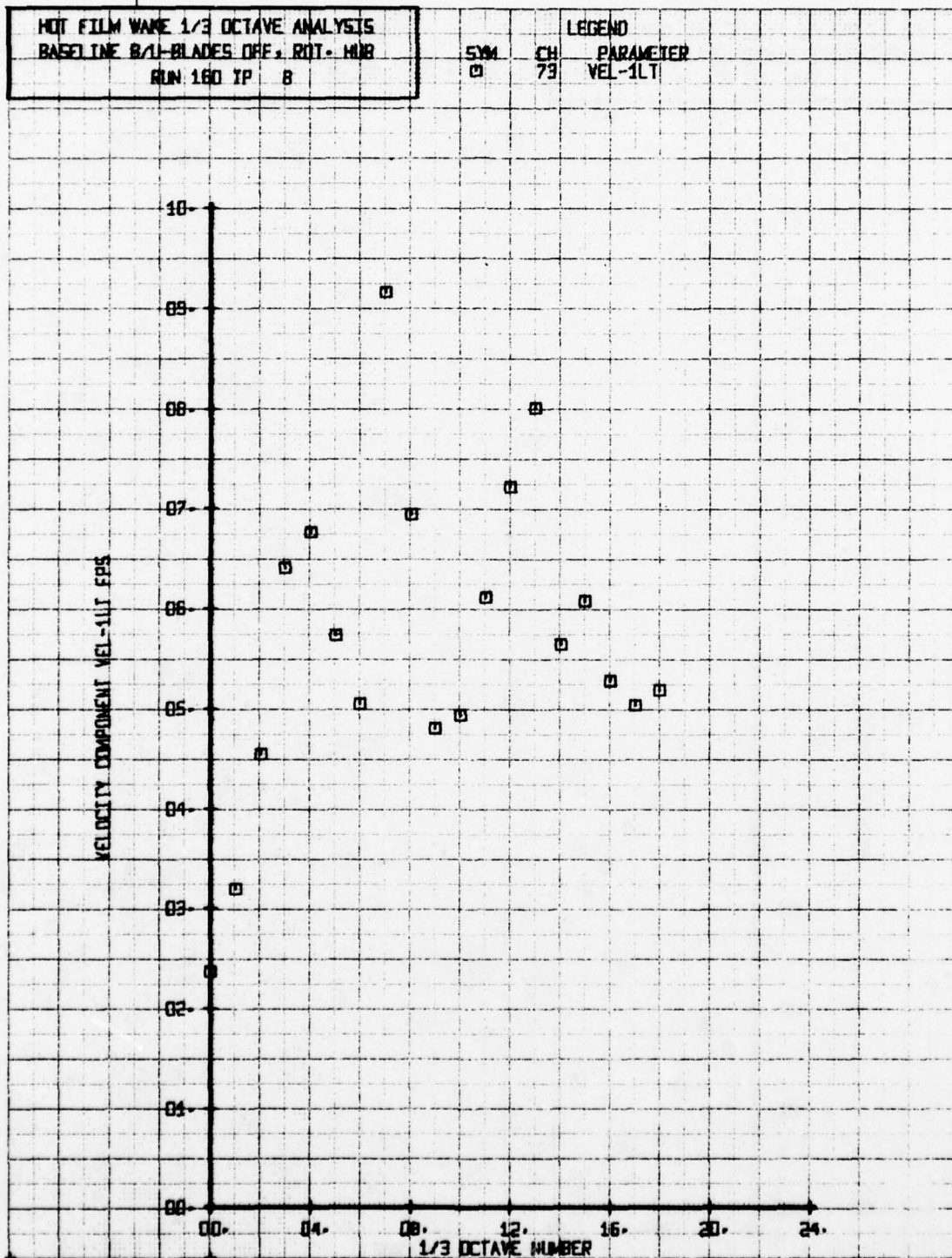


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/1-BLADES OFF, ROT. HUB
 RUN 160 TP B

SYM
 □

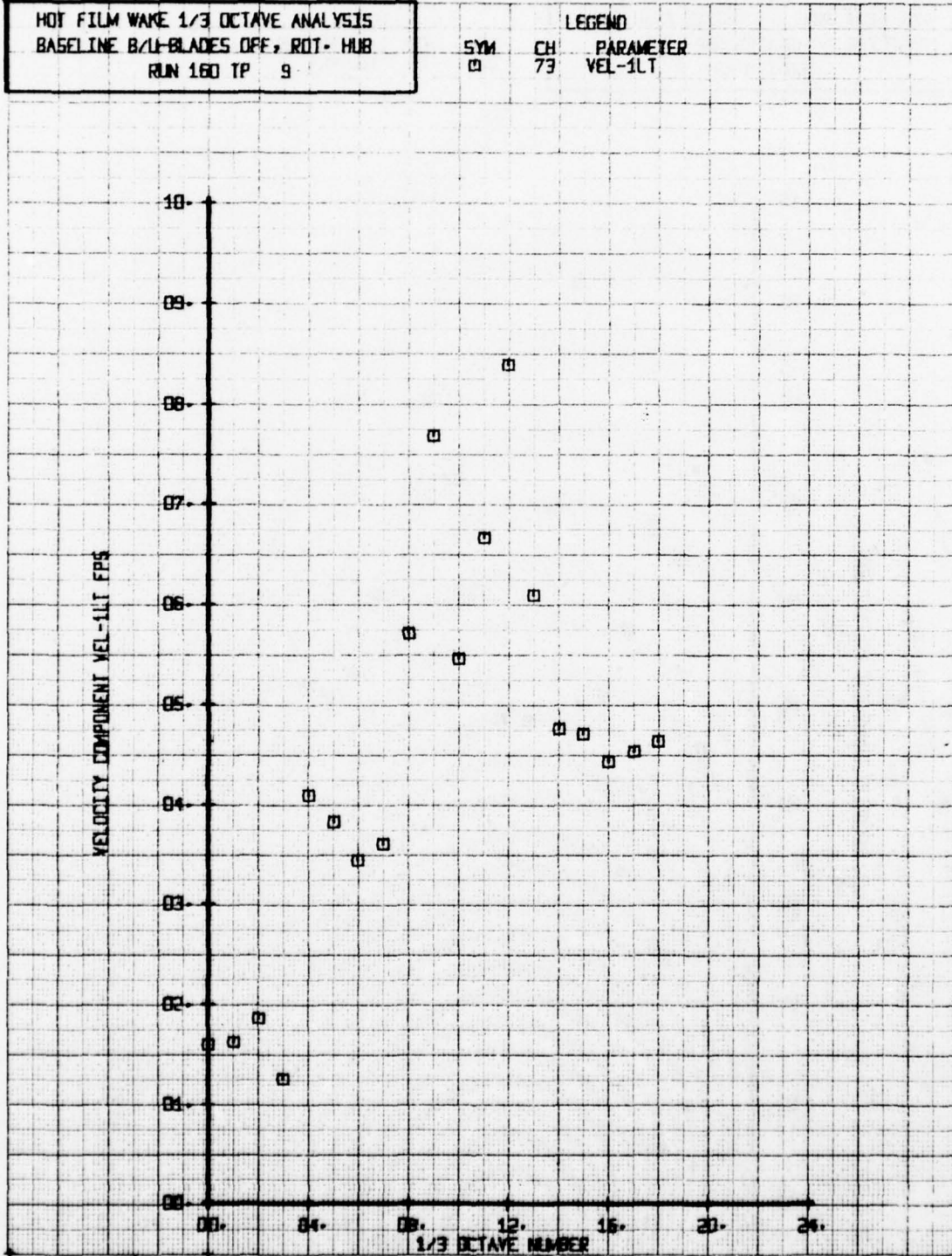
CH
 73

LEGEND
 PARAMETER
 VEL-1LT



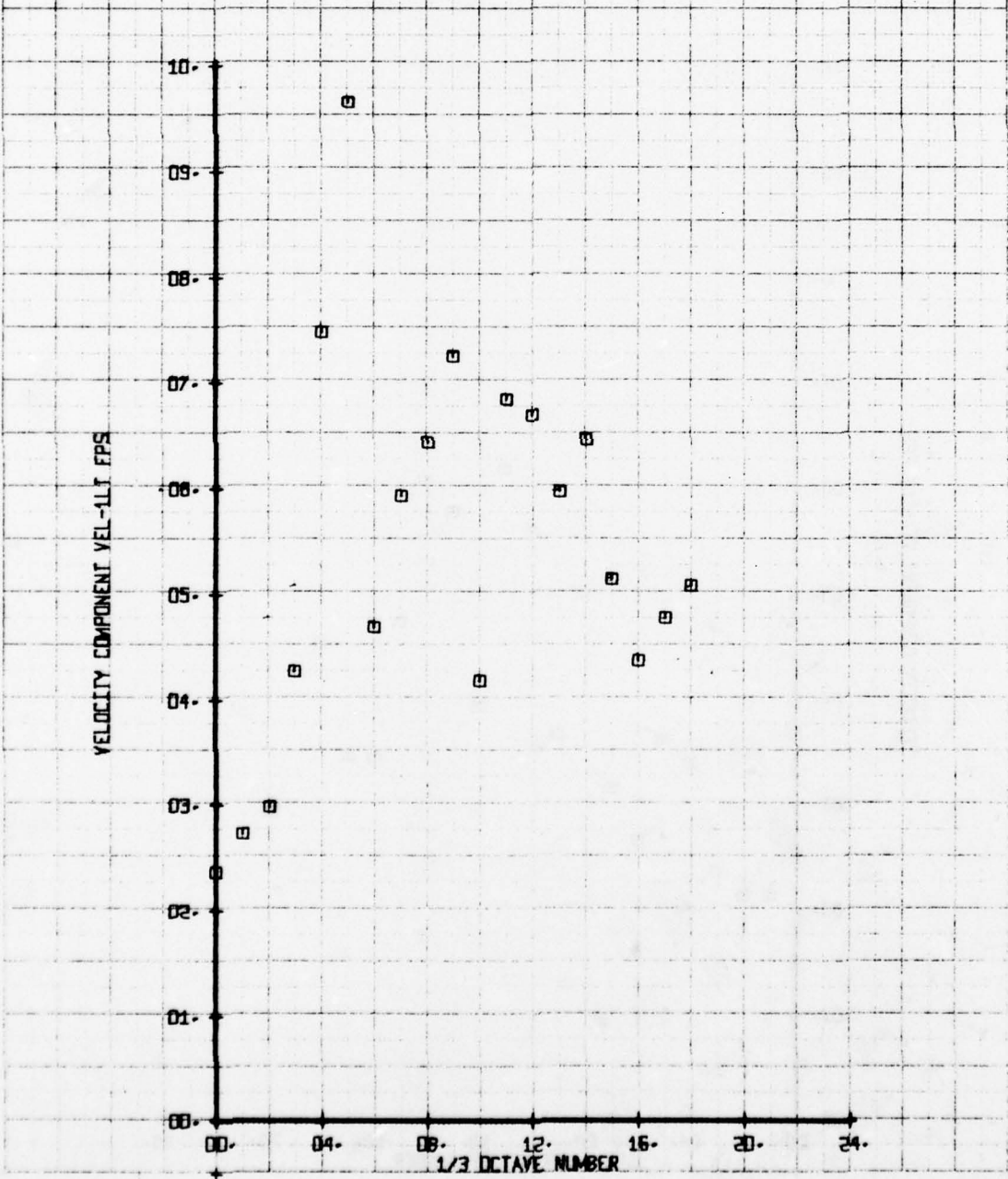
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/L-BLADES OFF, ROT-HUB
RUN 160 TP 9

LEGEND
SYM CH PARAMETER
□ 73 VEL-1LT



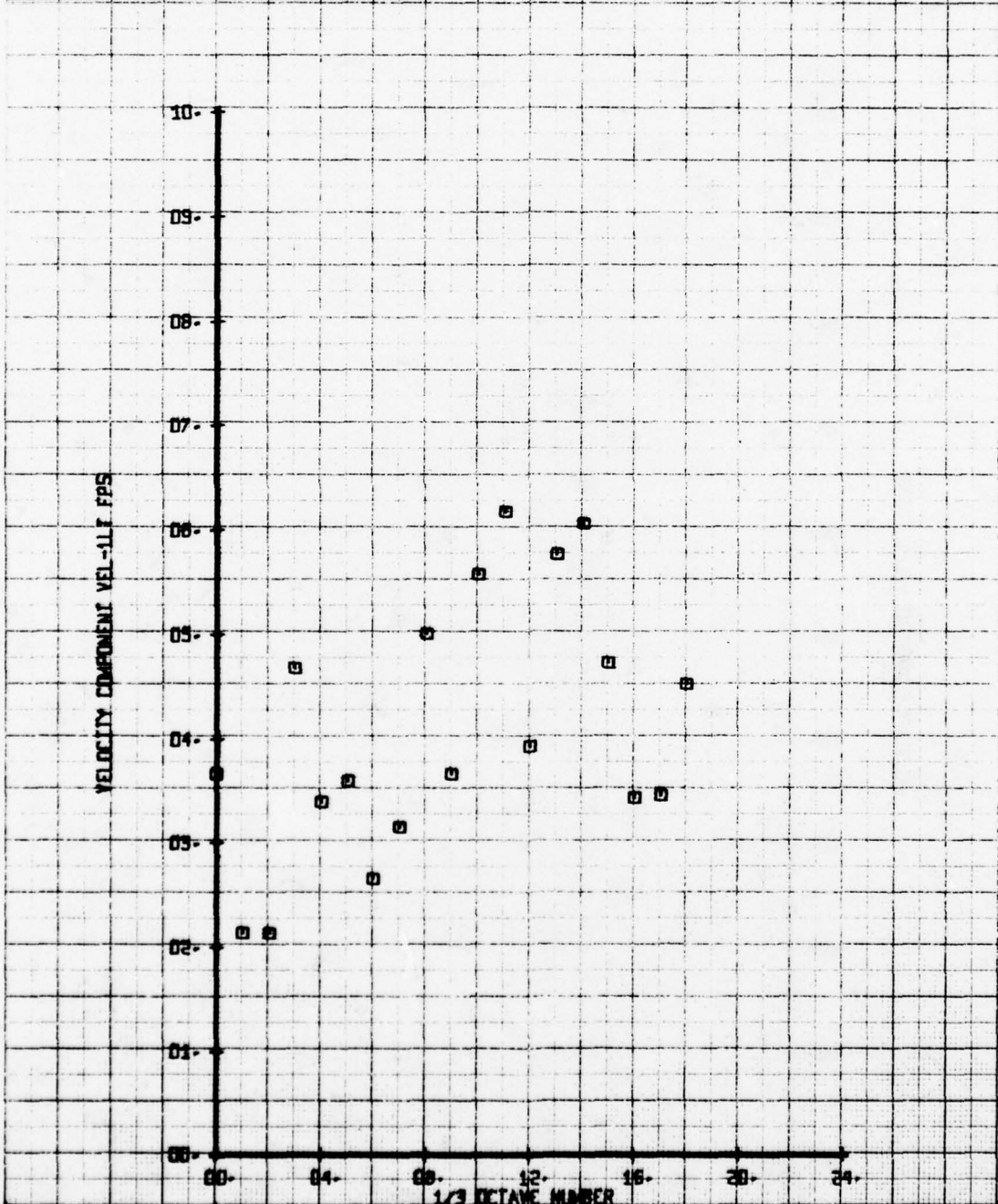
NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11 BLADES OFF; ROT- HUB
 RUN 160 TP 10

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



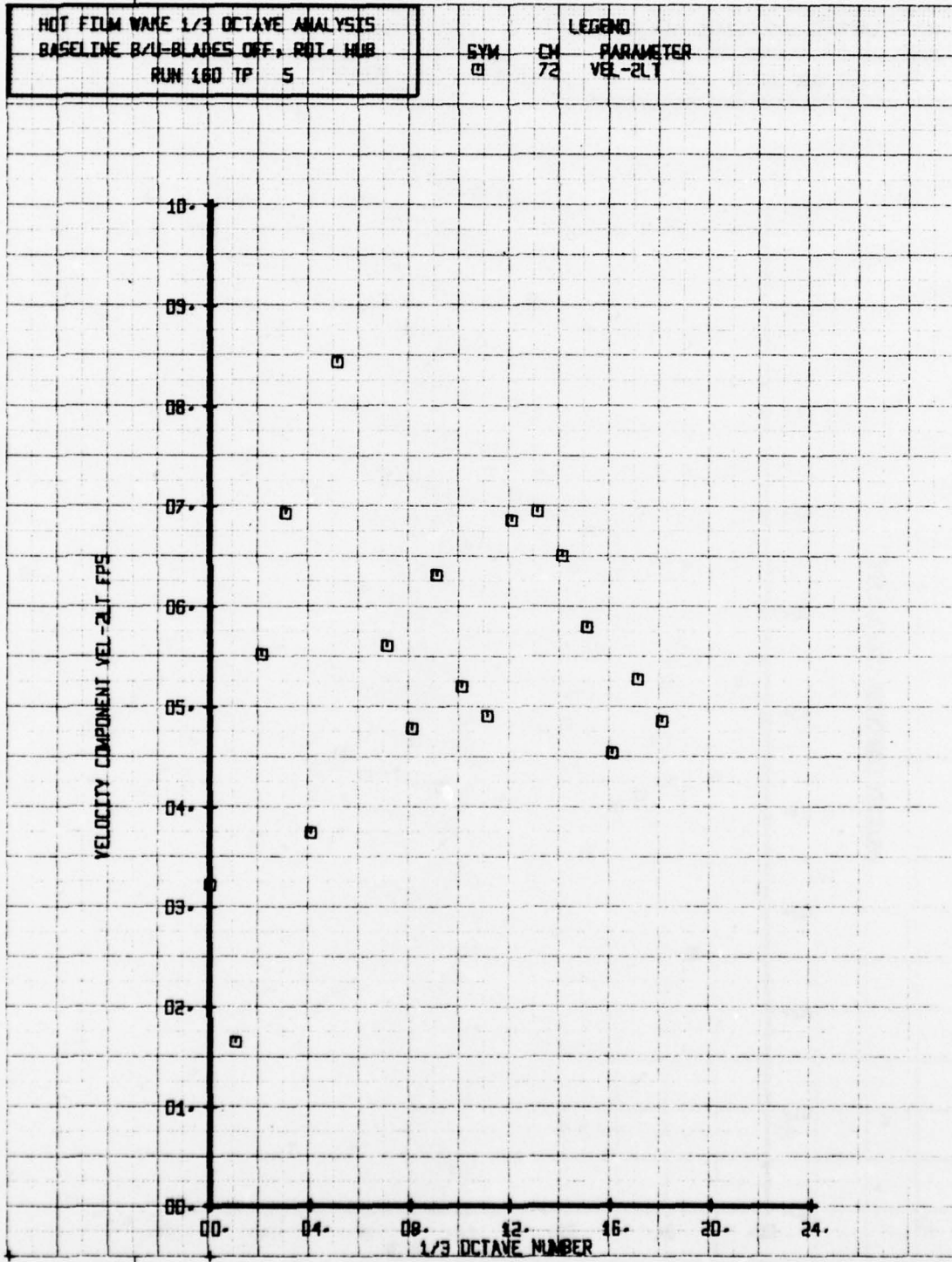
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES DRF, ROT-MIB
 RUN 180 TP 11

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



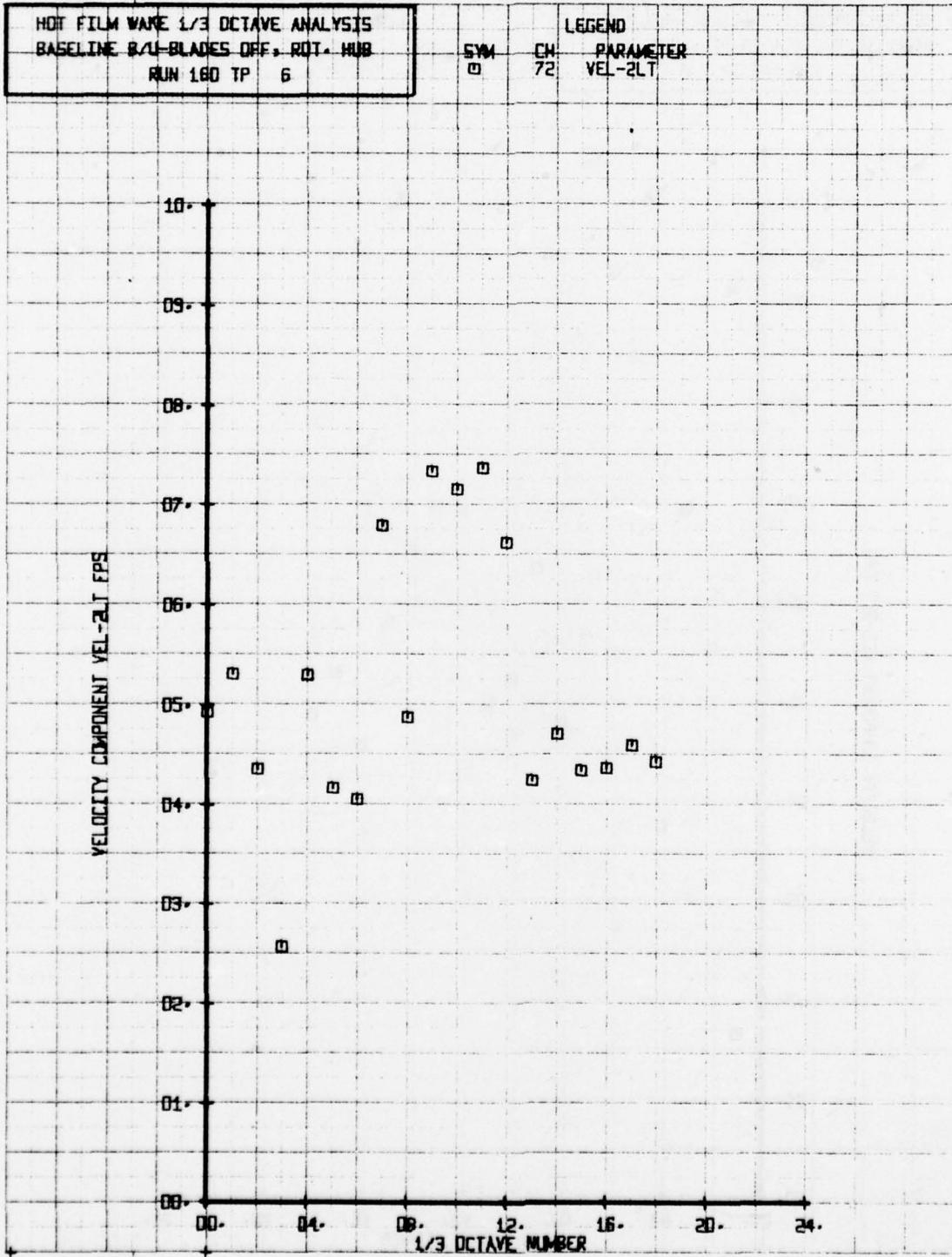
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT. HUB
RUN 160 TP 5

SYM CH PARAMETER
□ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE R/L-BLADES OFF, ROT. HUB
RUN 180 TP 6

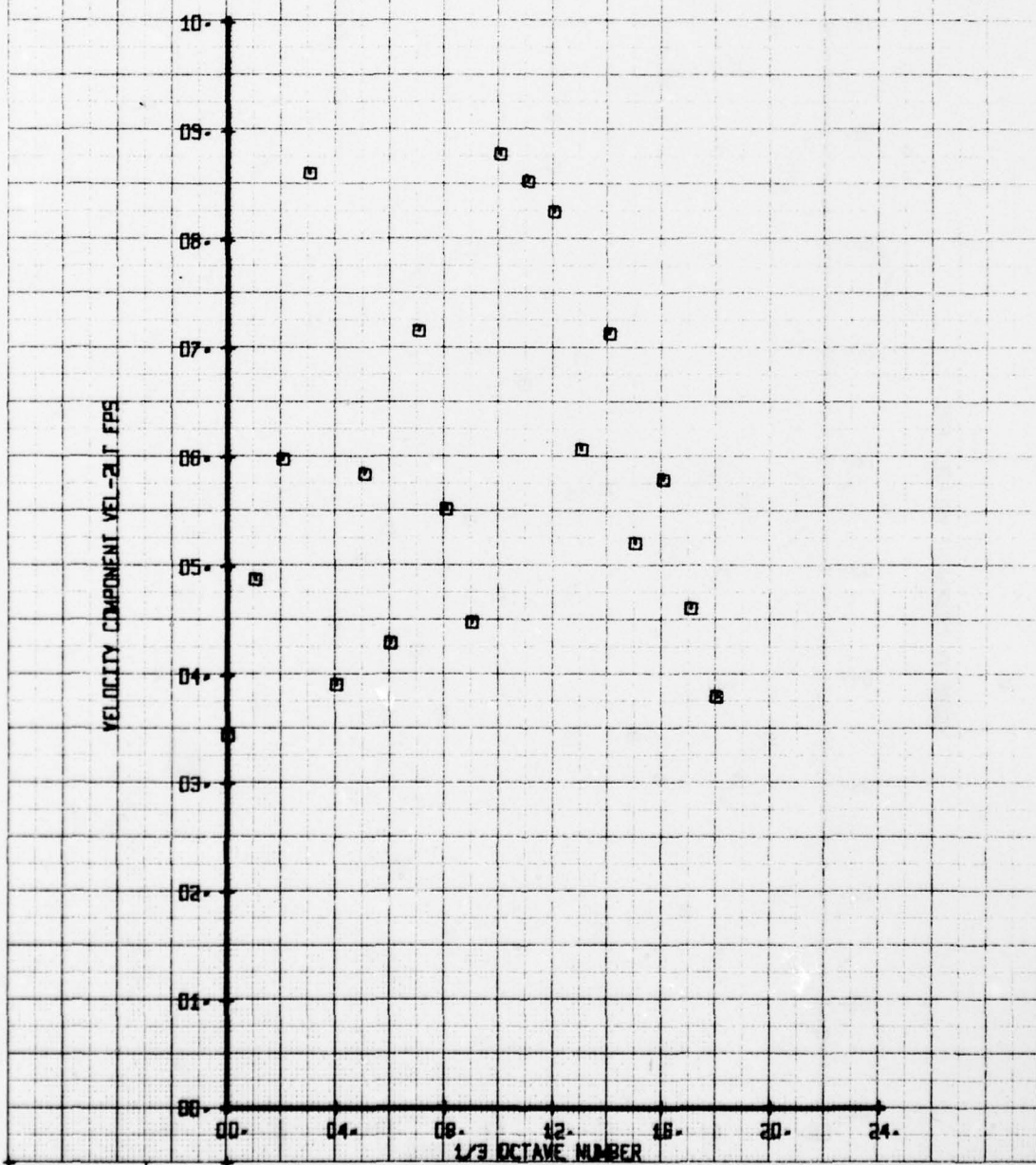
SYM CH PARAMETER
□ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/U-BLADES OFF, ROT. HUB
RUN 180 TP 7

SYM CH PARAMETER
□ 72 VEL-2LT

VELOCITY COMPONENT VEL-2LT FPS



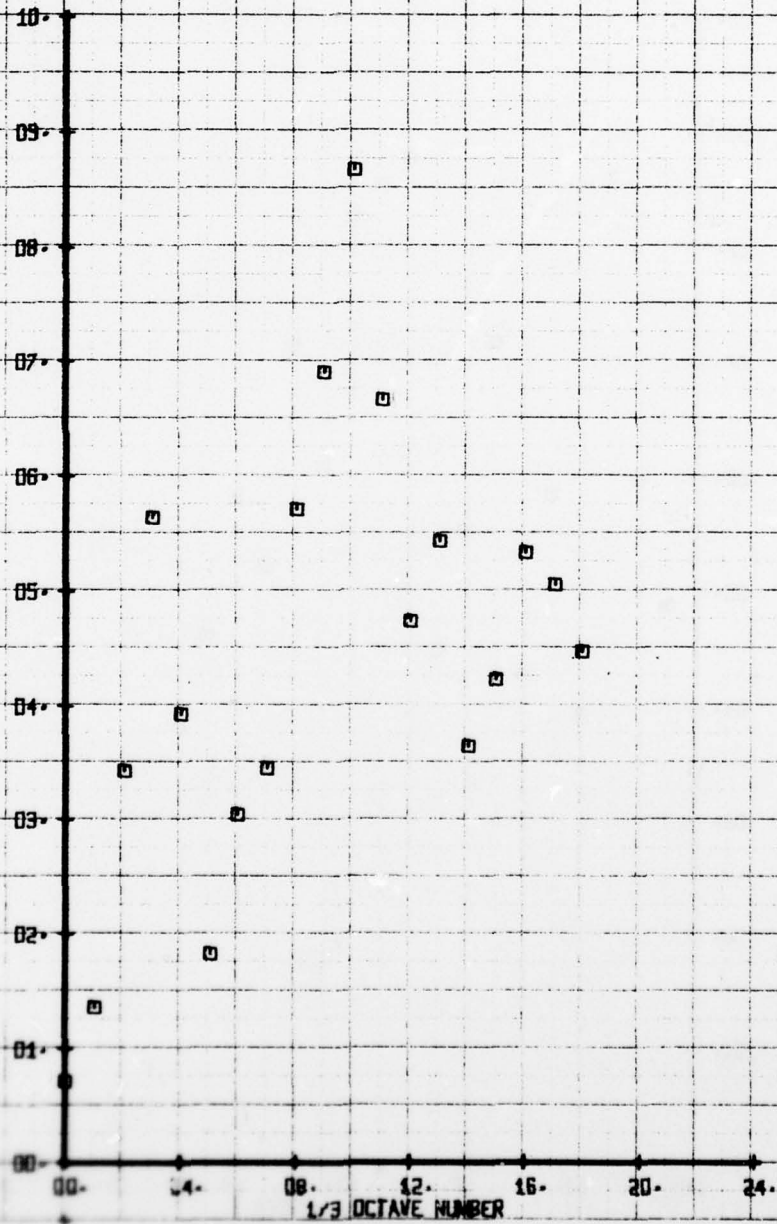
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 8

SYM
 □

CH
 72

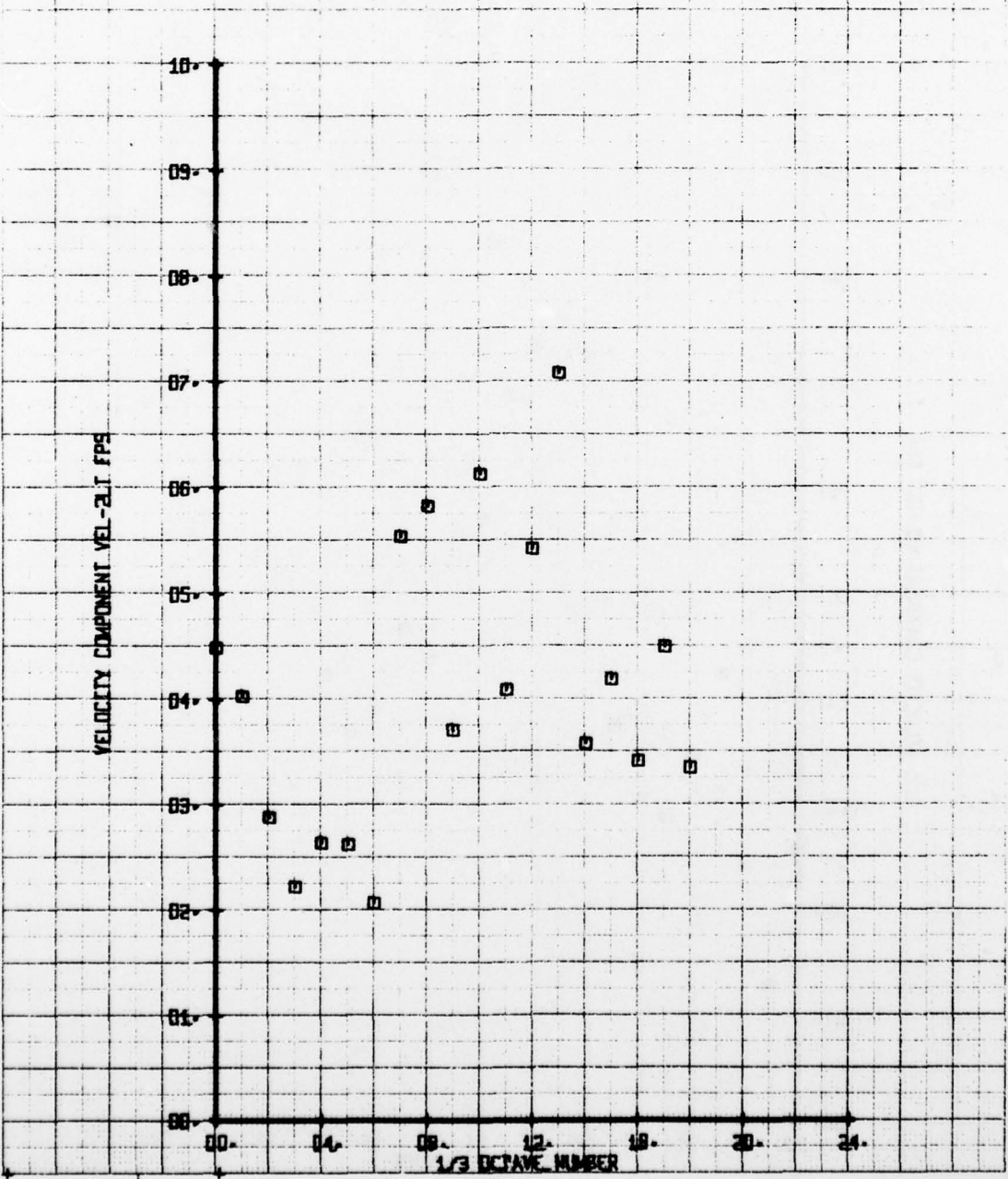
LEGEND
 PARAMETER
 VEL-ZLT

VELOCITY COMPONENT VEL-ZLT FPS



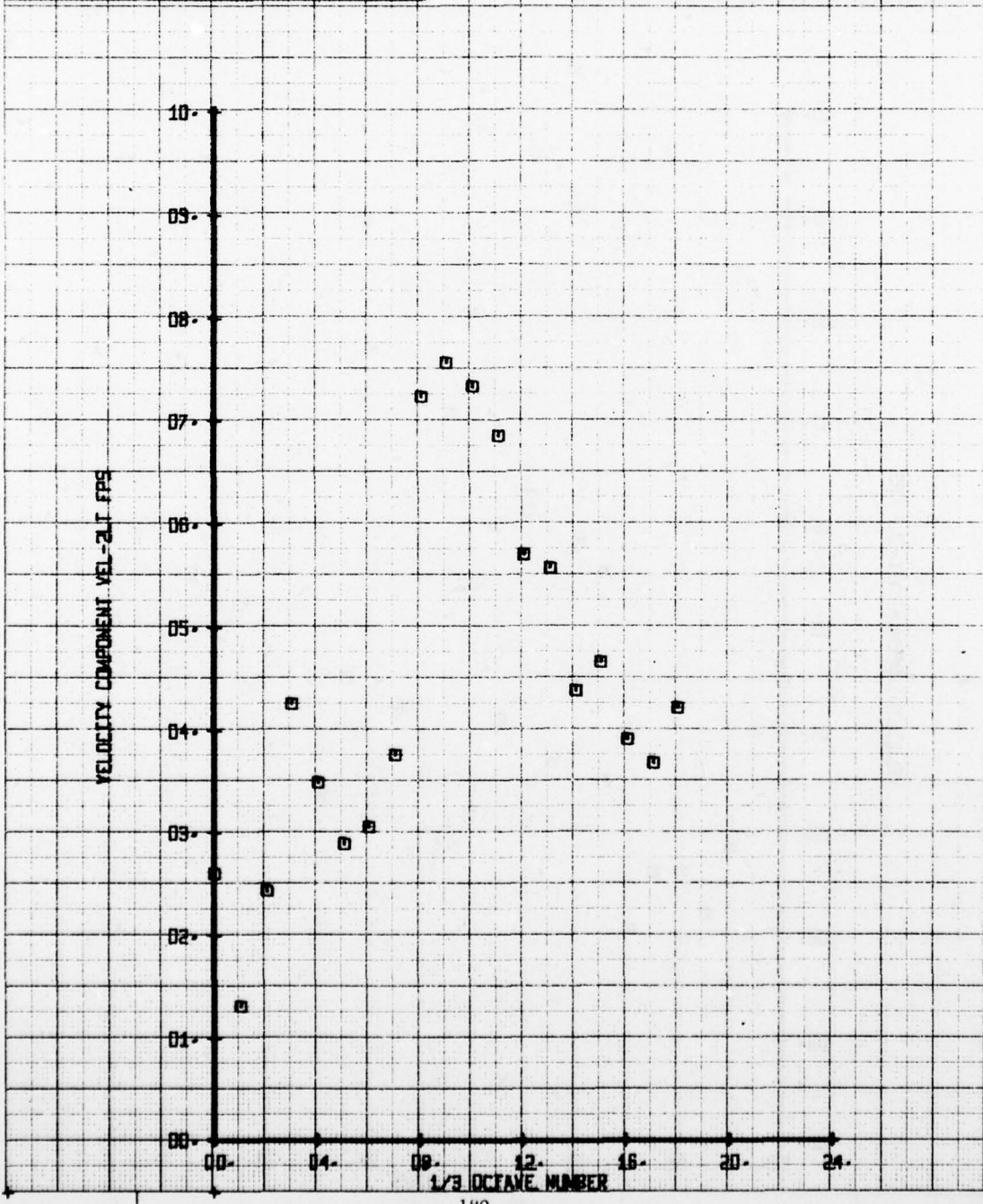
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/4-BLADES OFF, ROT, HOB
 RUN 180 TP 9

SYN CH PARAMETER
 □ 72 VEL-2LT



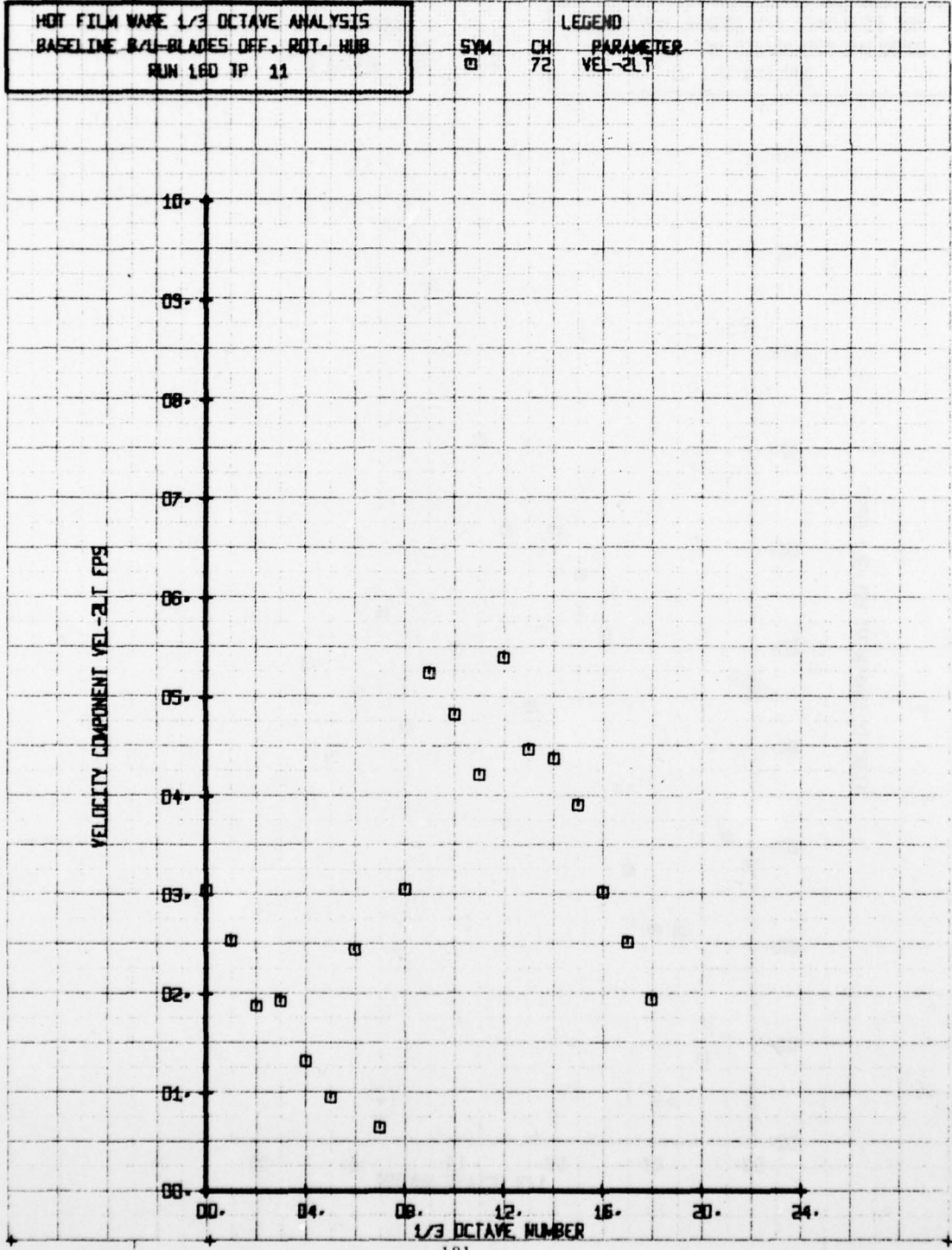
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 10

SYM CH PARAMETER
 □ 72 VEL-2LT



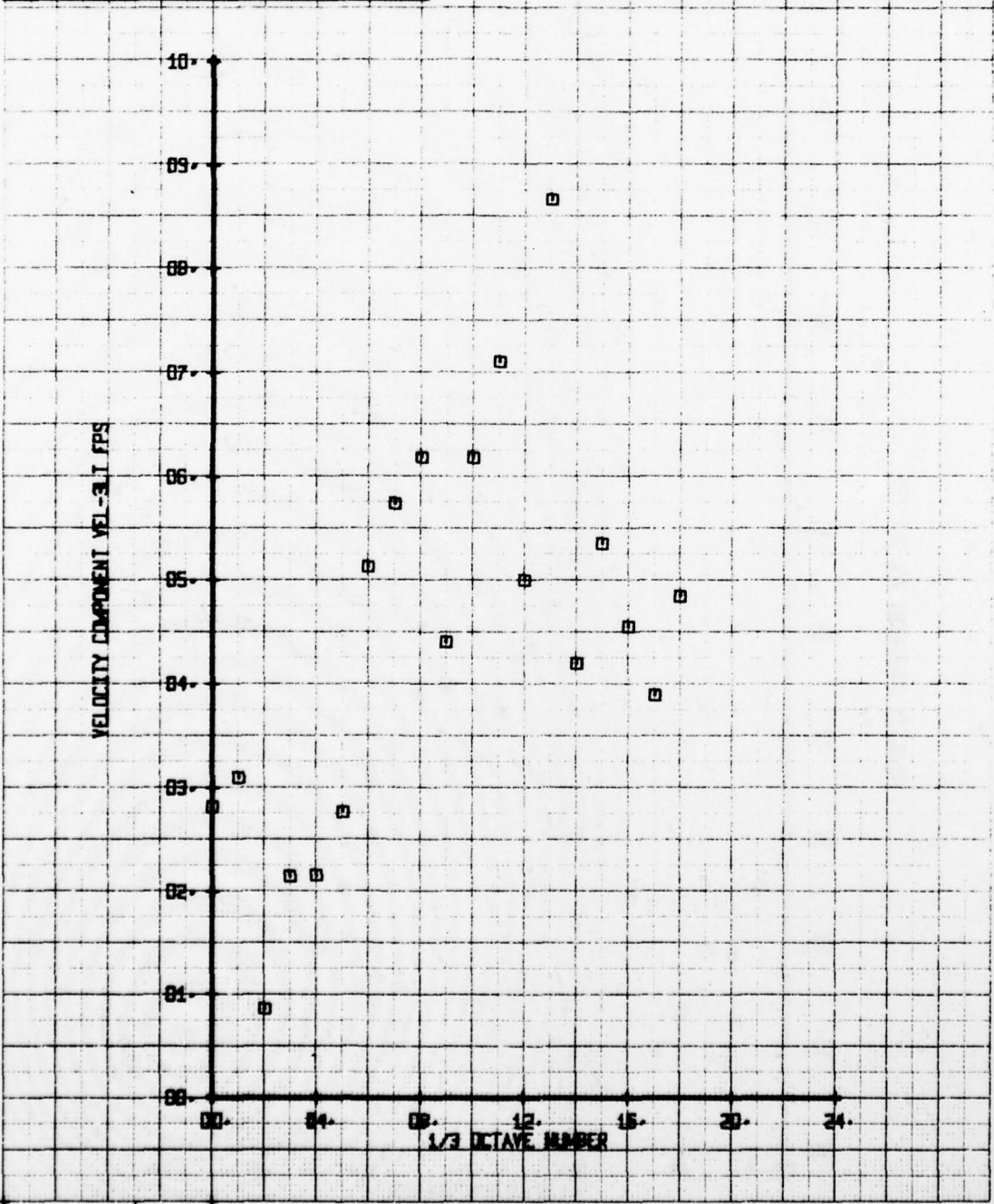
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/1-BLADES OFF, ROT. HUB
 RUN 180 TP 11

SYN CH PARAMETER
 0 72 VEL-2LT



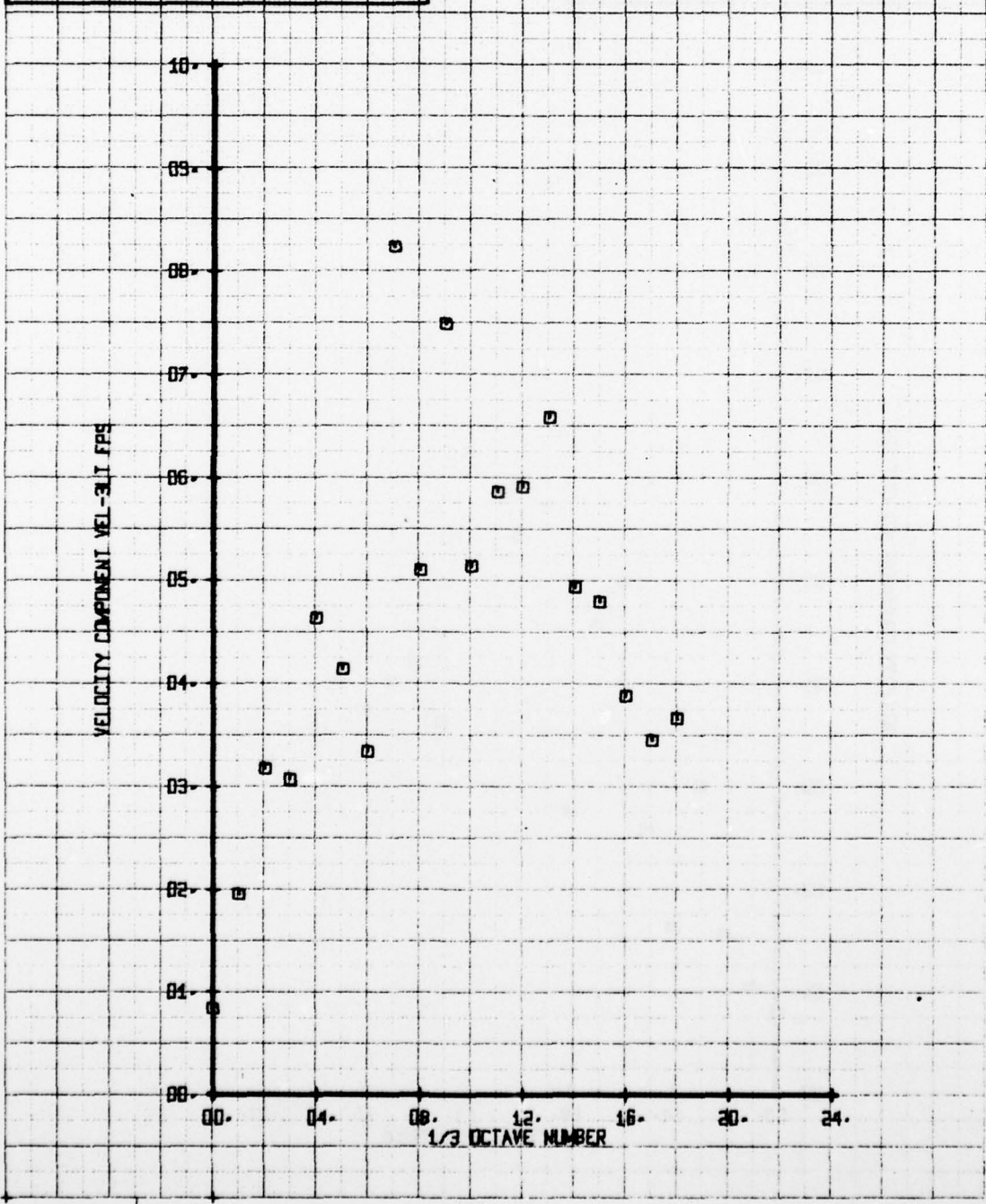
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/1-BLADES OFF, ROT, HUB
 RUN 180 TP 5

LEGEND
 CH: 70
 PARAMETER
 VEL-3LT



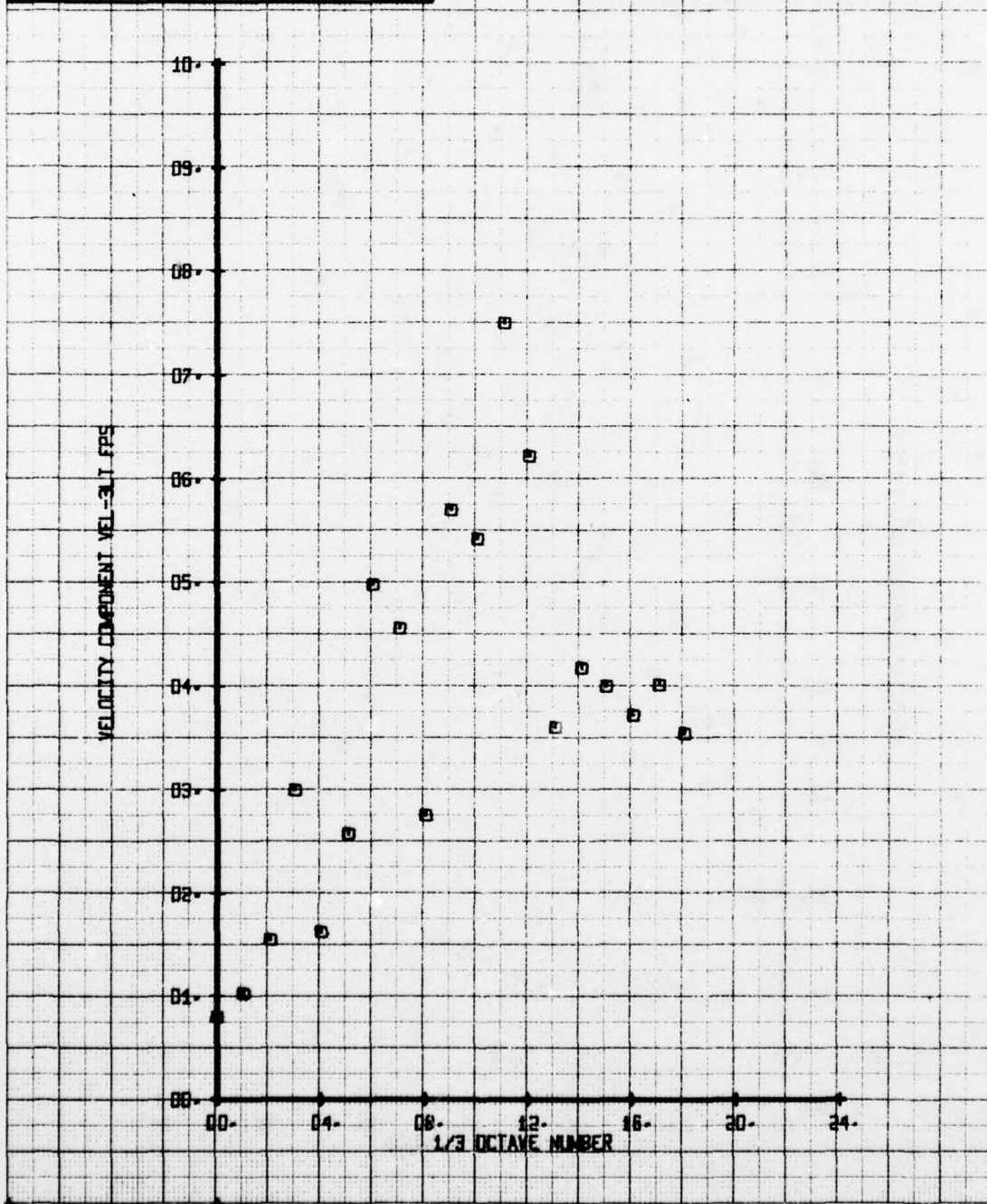
HOT FILM WARE 1/3 OCTAVE ANALYSIS
 BASELINE B/L-BLADES OFF, ROT. HUB
 RUN 180 TP 6

LEGEND
 SYM CH PARAMETER
 □ 70 VEL-3LT



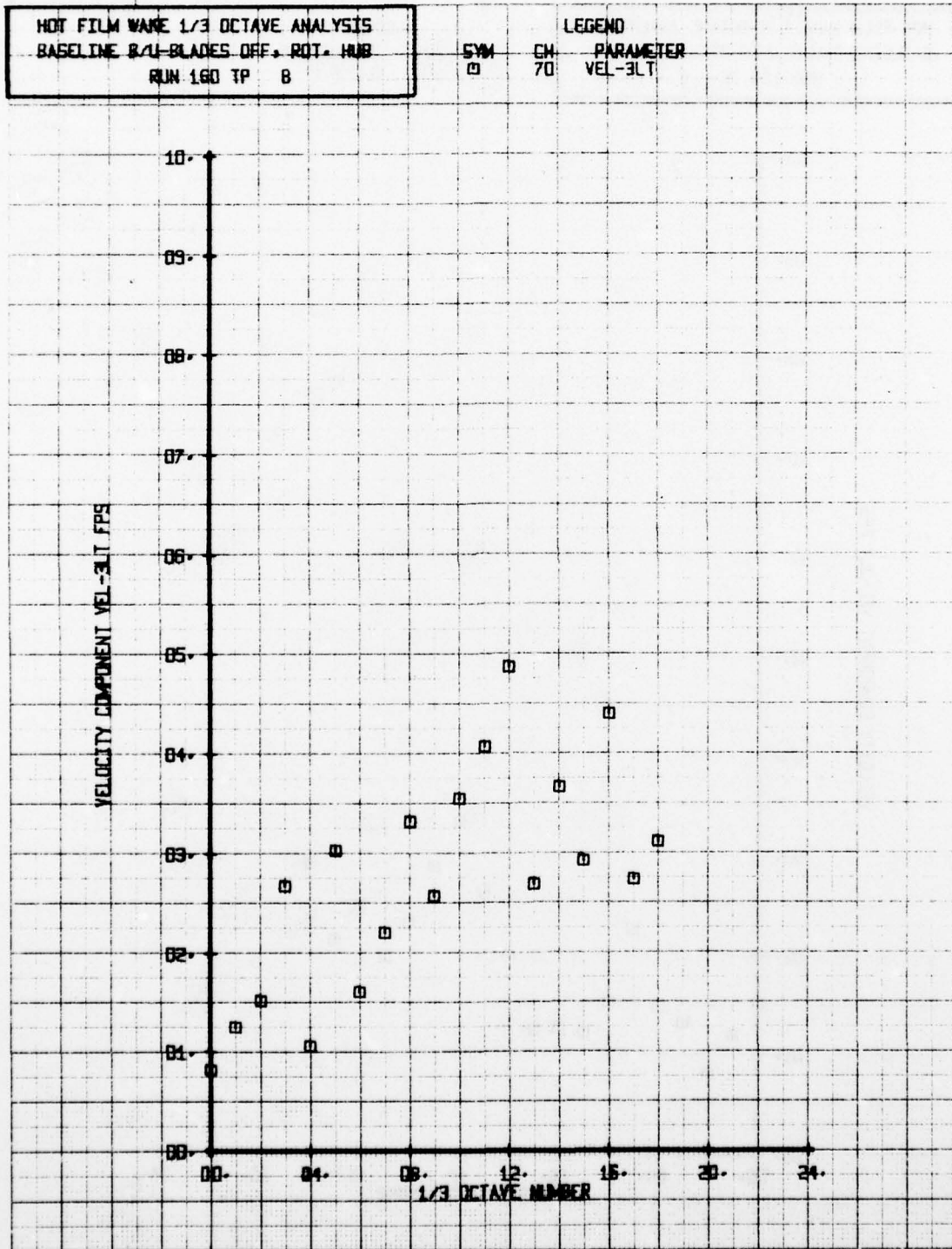
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, ROT. HUB
RUN 180 TP 7

SYM CH PARAMETER
□ 70 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE R/U-BLADES OFF, ROT. HUB
 RUN 160 TP B

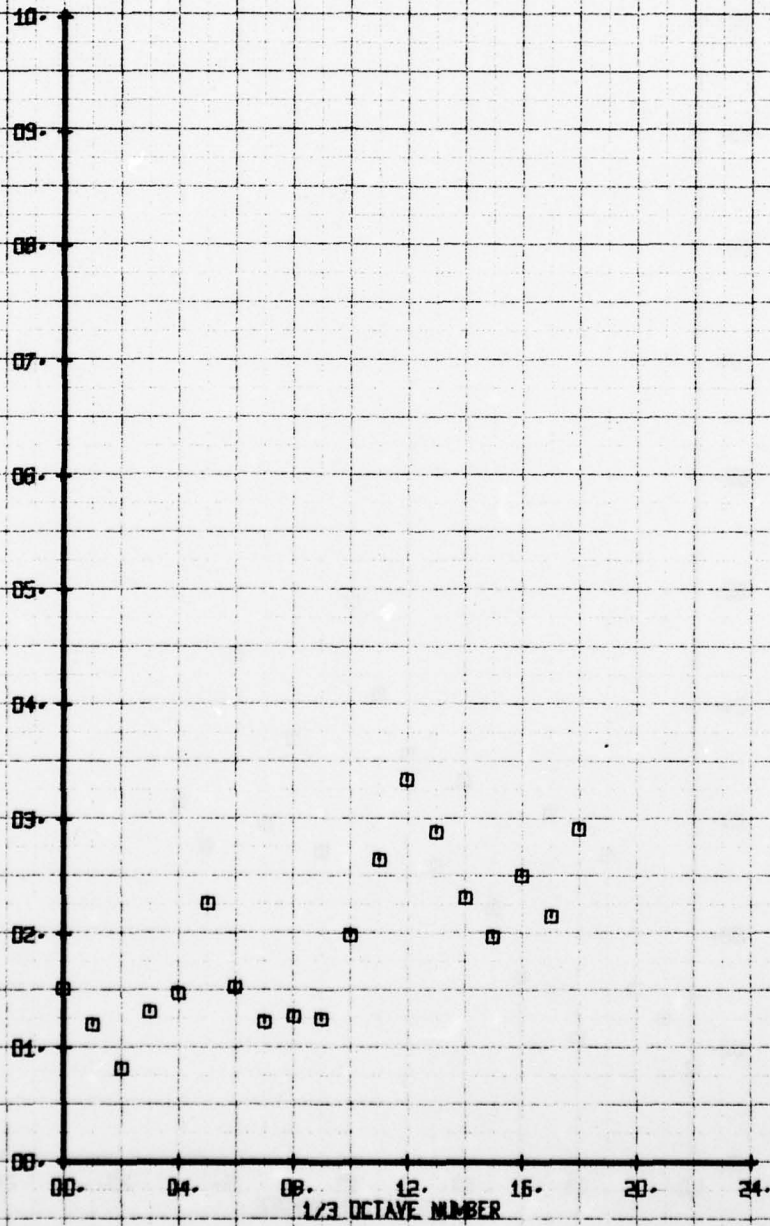
SYN CH PARAMETER
 0 70 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/4-BLADES OFF, ROT. HUB
RUN 160 TP 9

SYN CH PARAMETER
0 70 VEL-3LT

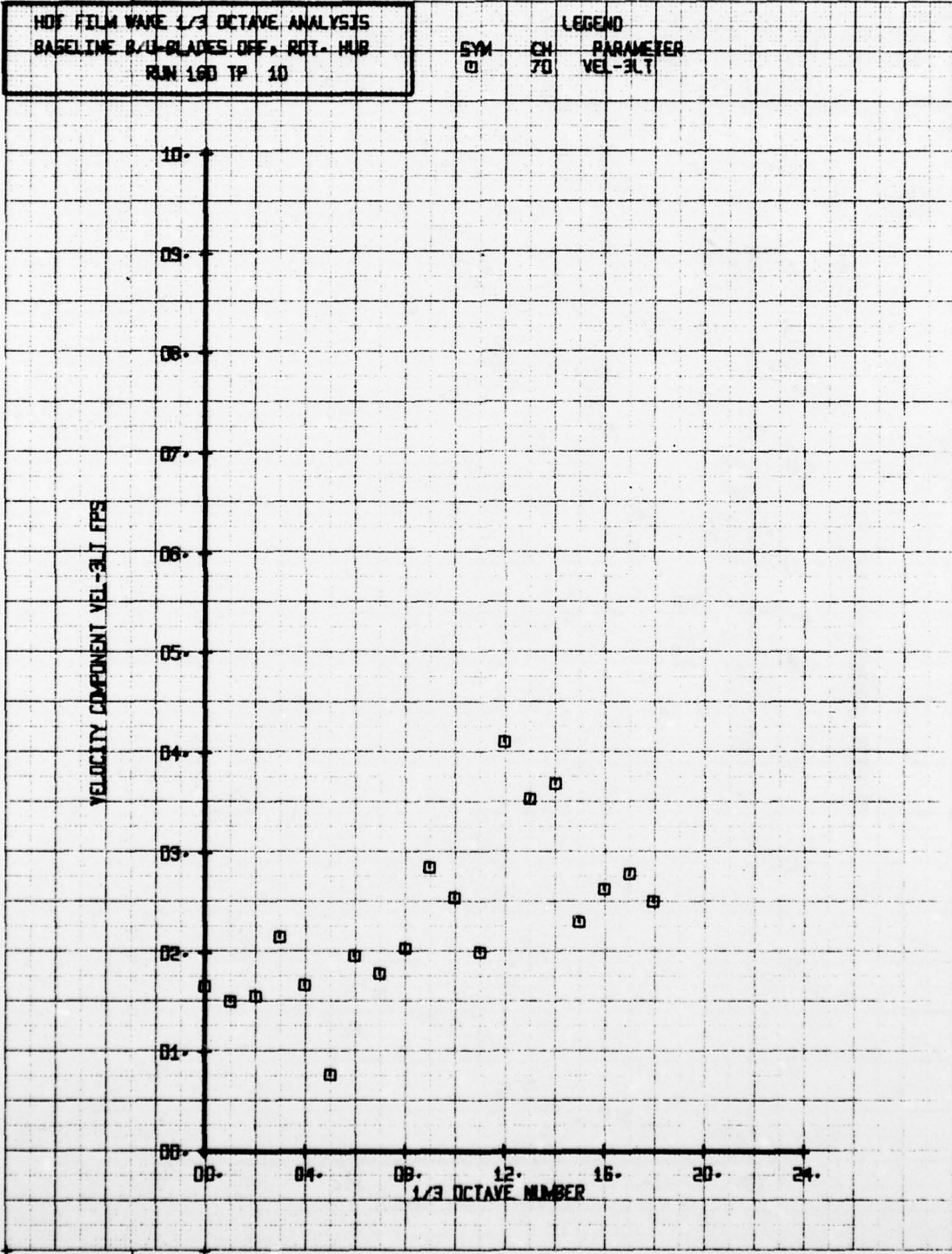
VELOCITY COMPONENT VEL-3LT FPS



NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, ROT. HUB
 RUN 160 TP 10

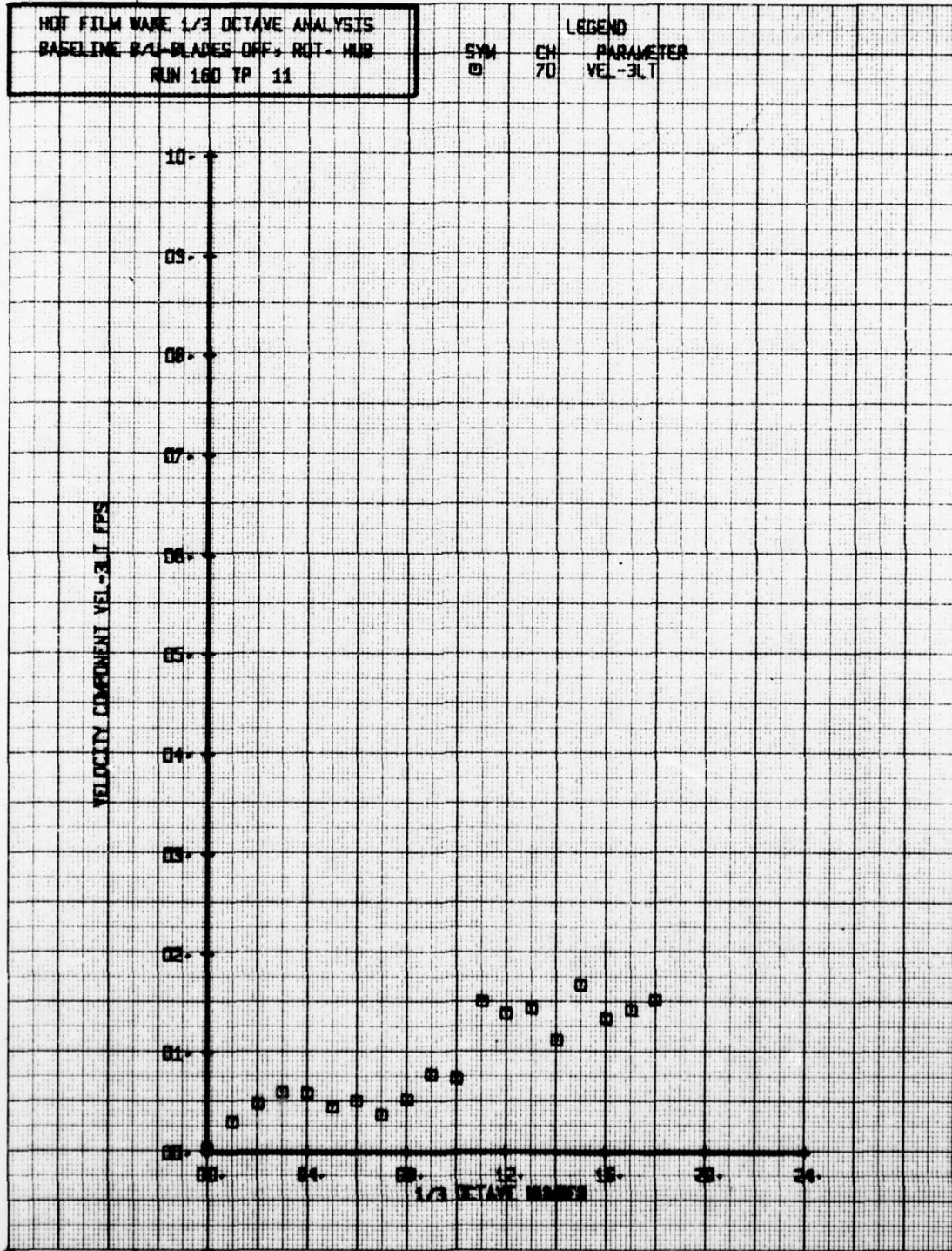
SYM	CH	PARAMETER
□	70	VEL-3LT

VELOCITY COMPONENT VEL-3LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8-1- BLADES OFF, ROT. HUB
 RUN 160 TP 11

SYM	CH	PARAMETER
⊙	70	VEL-3LT



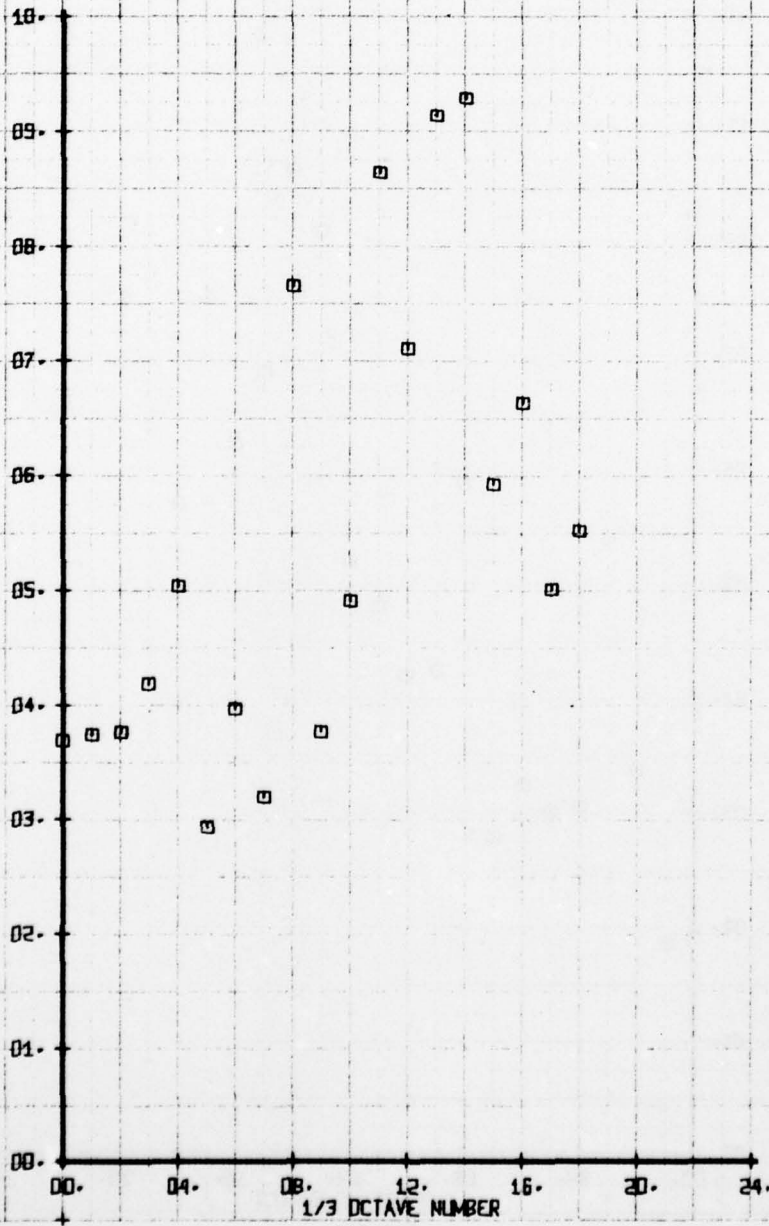
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 2

SYM
□

CH
71

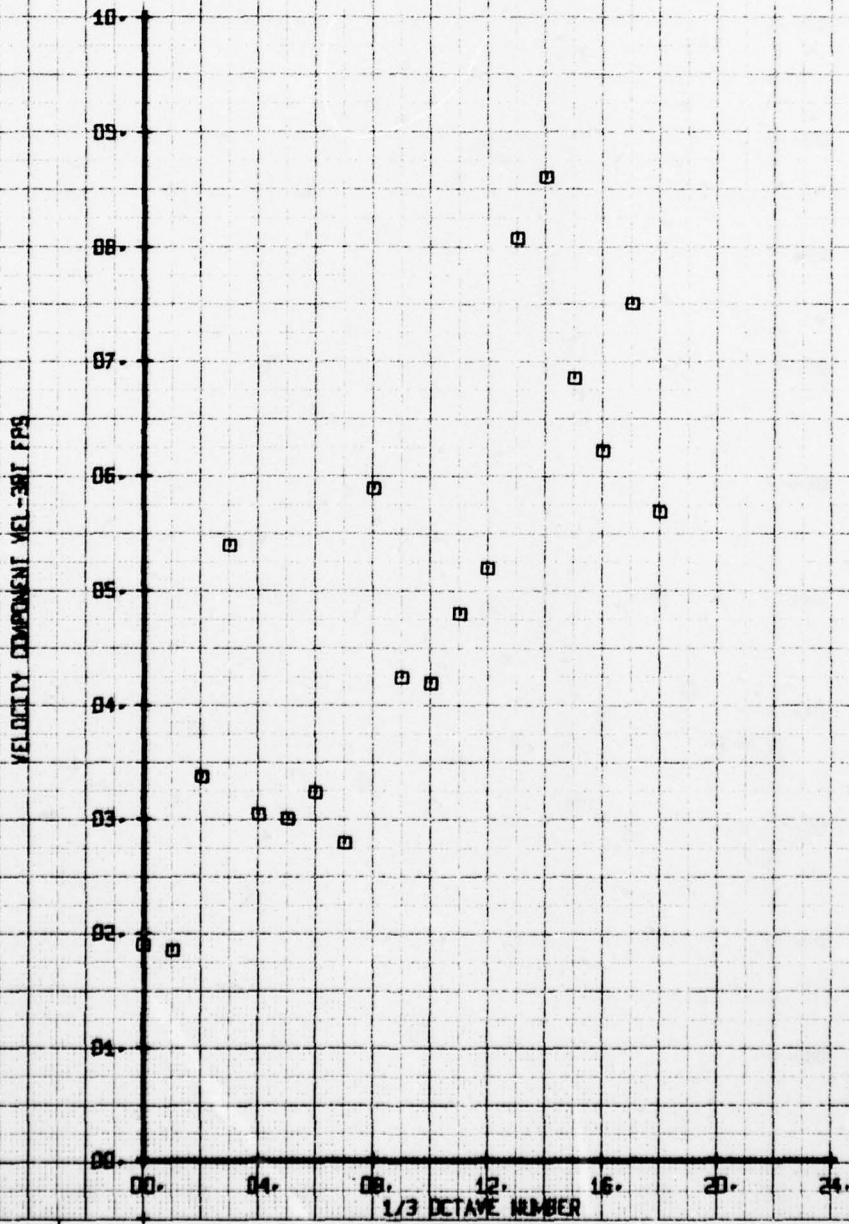
LEGEND
PARAMETER
VEL-3RT

VELOCITY COMPONENT VEL-3RT FPS



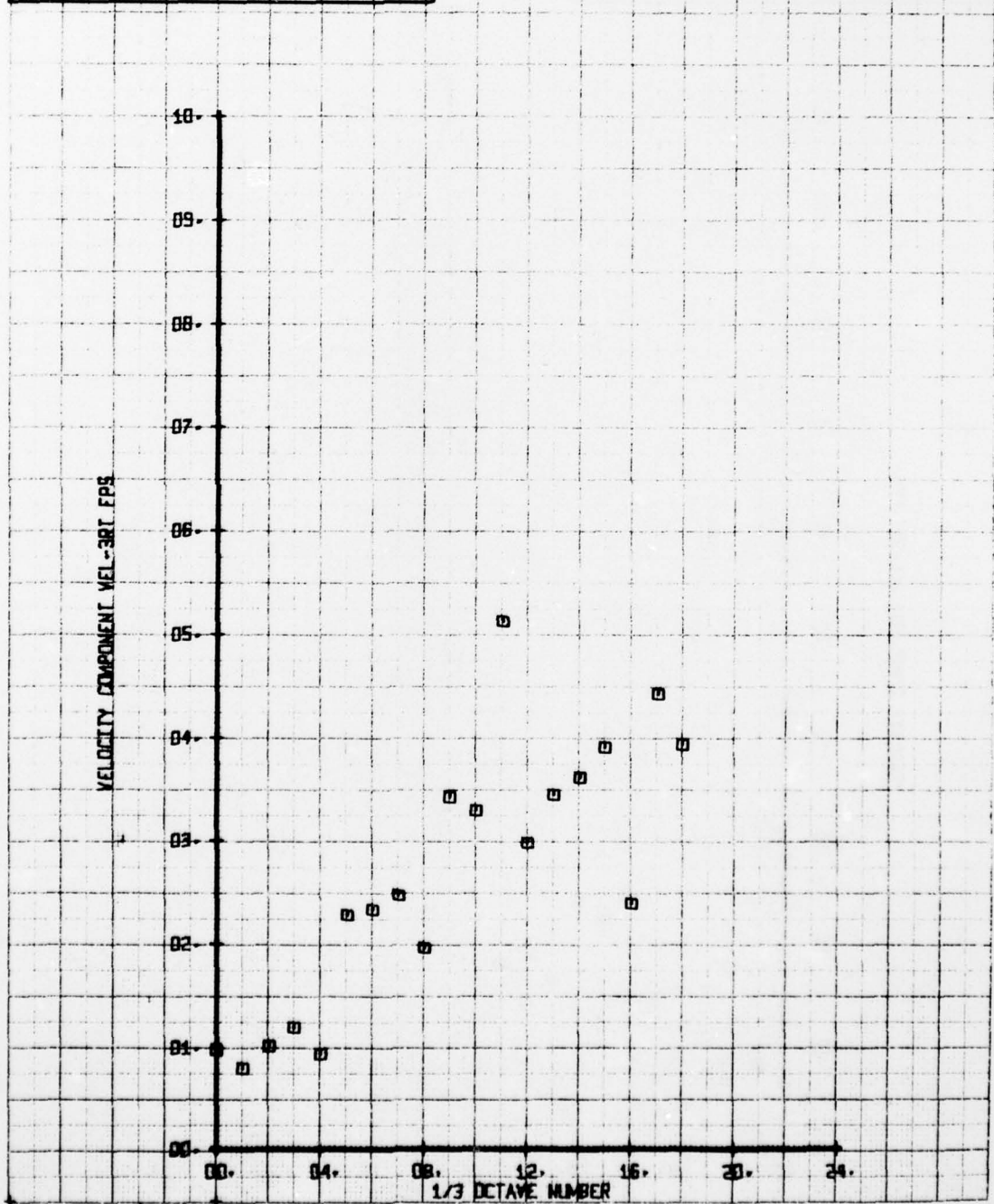
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 3

SYN CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 4

LEGEND
 SYM CH PARAMETER
 □ 71 VEL-3RT



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONFI--ETC(U)
SEP 78 P F SHERIDAN

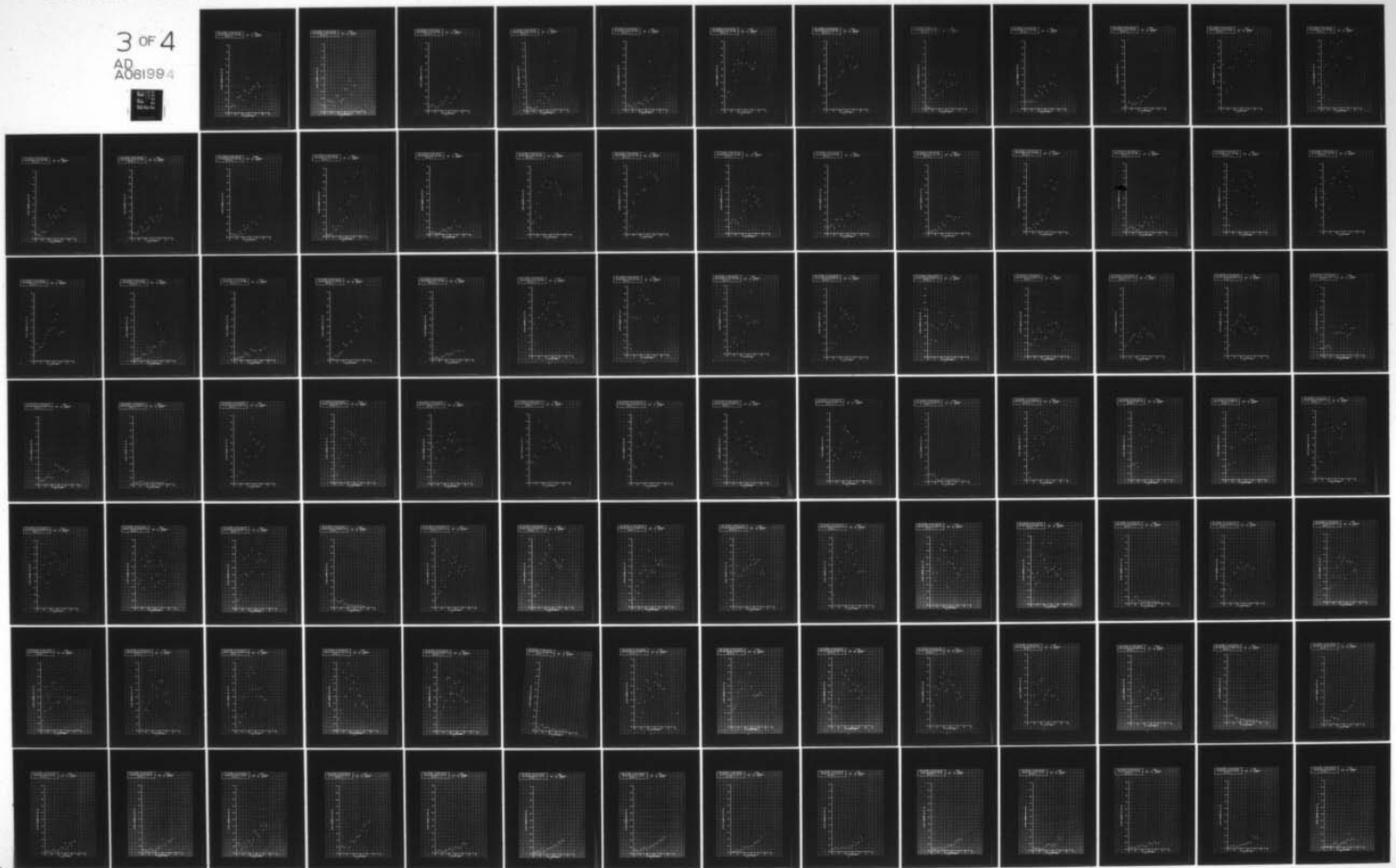
F/8 1/3
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UNCLASSIFIED

USARTL-TR-78-23F

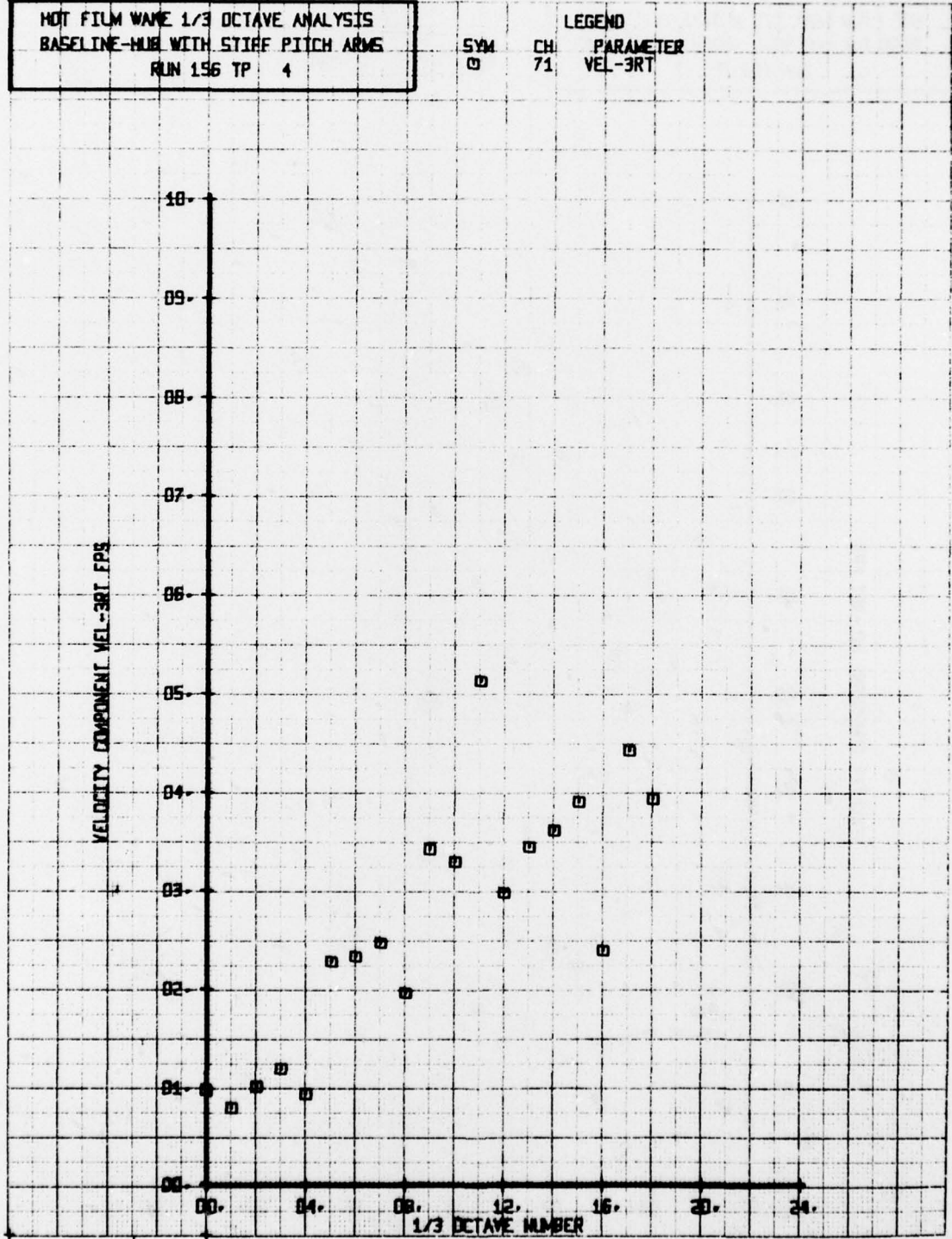
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3 OF 4
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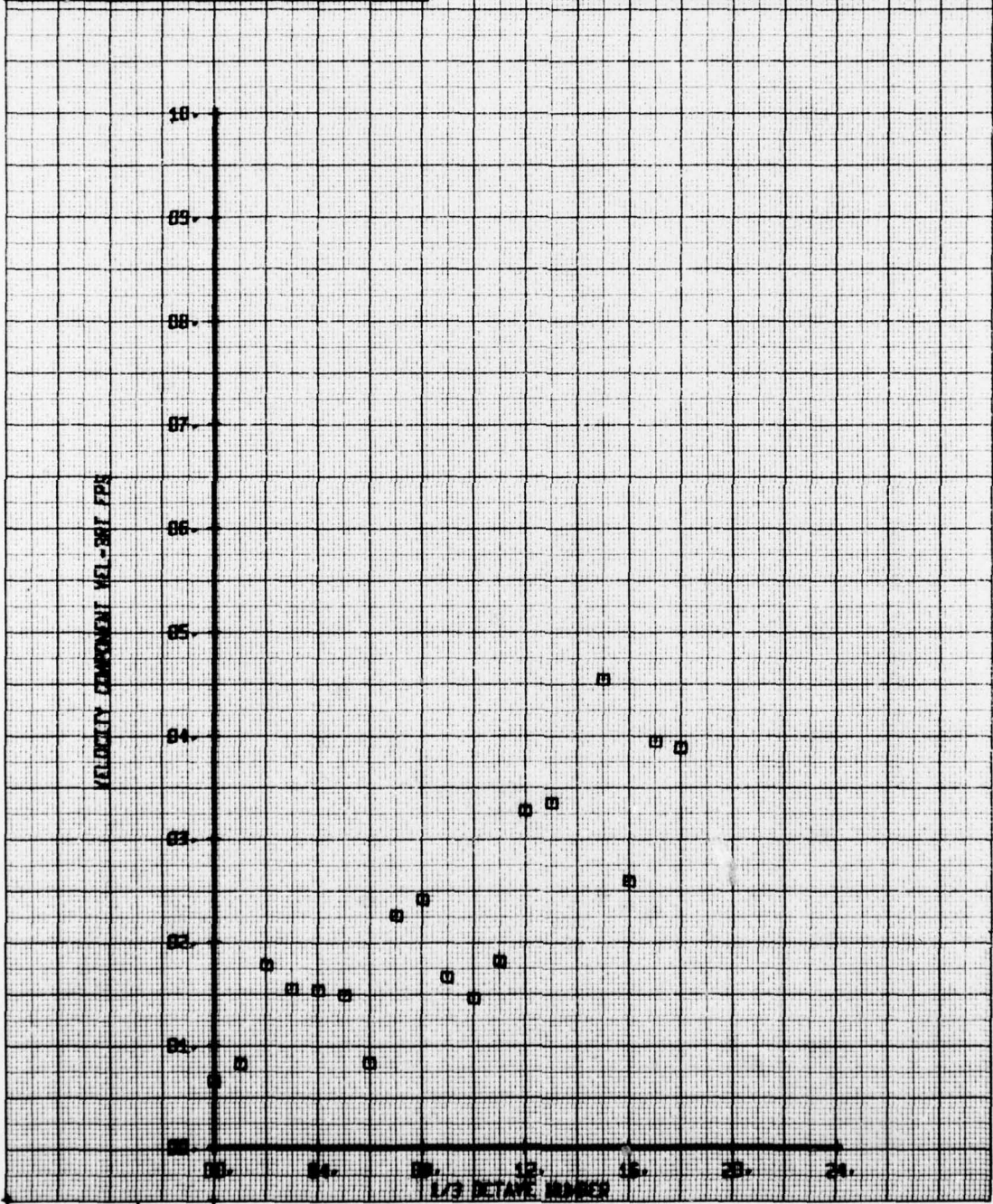
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 4

SYM CH PARAMETER
 □ 71 VEL-3RT



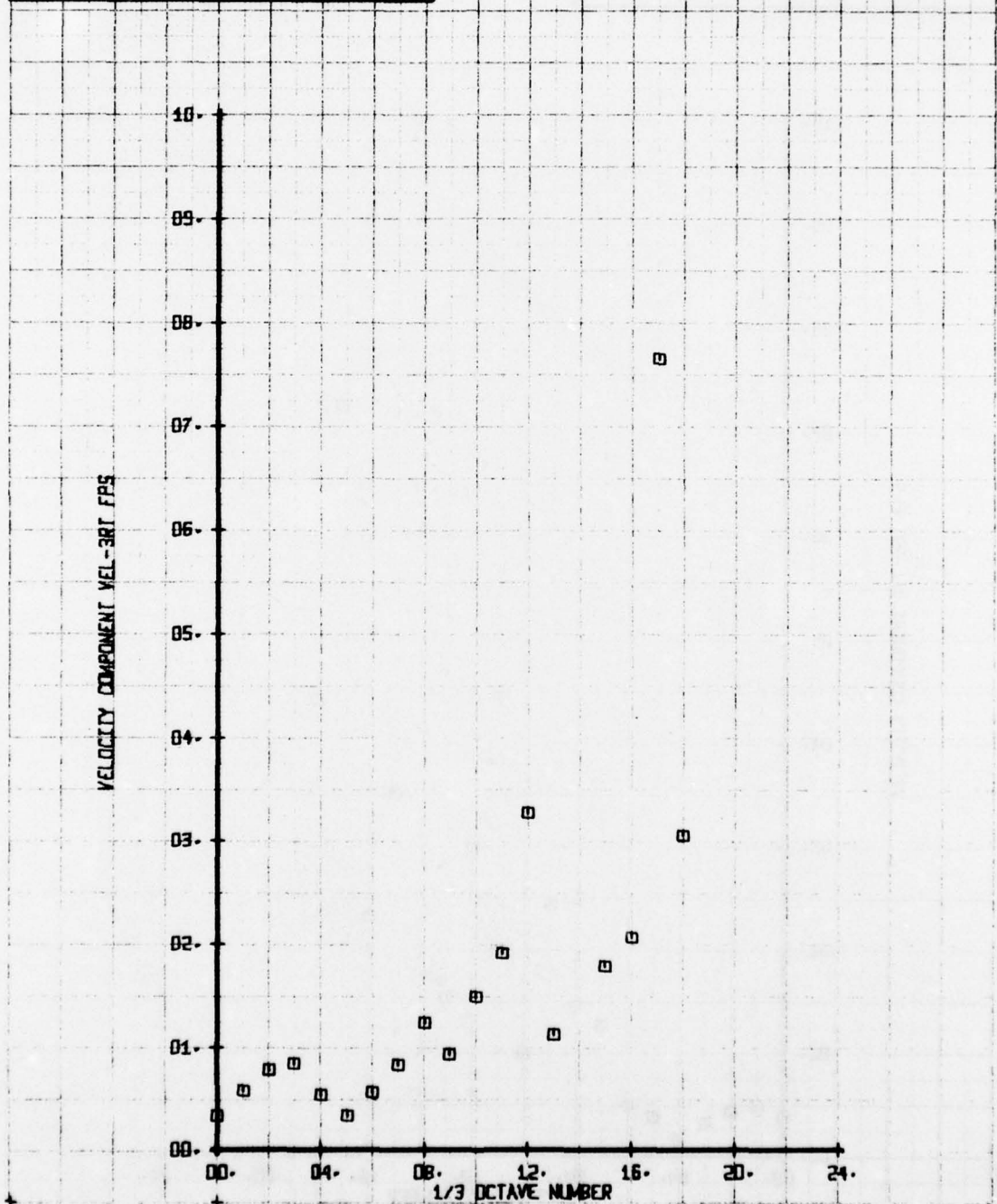
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-MIG WITH STIFF PITCH ARMS
 RUN 156 TP 5

SYM	CH	LEGEND
□	71	PARAMETER VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE HUB WITH STIFF PITCH ARMS
 RUN 156 IP 6

LEGEND
 SYM CH PARAMETER
 □ 71 VEL-3RT

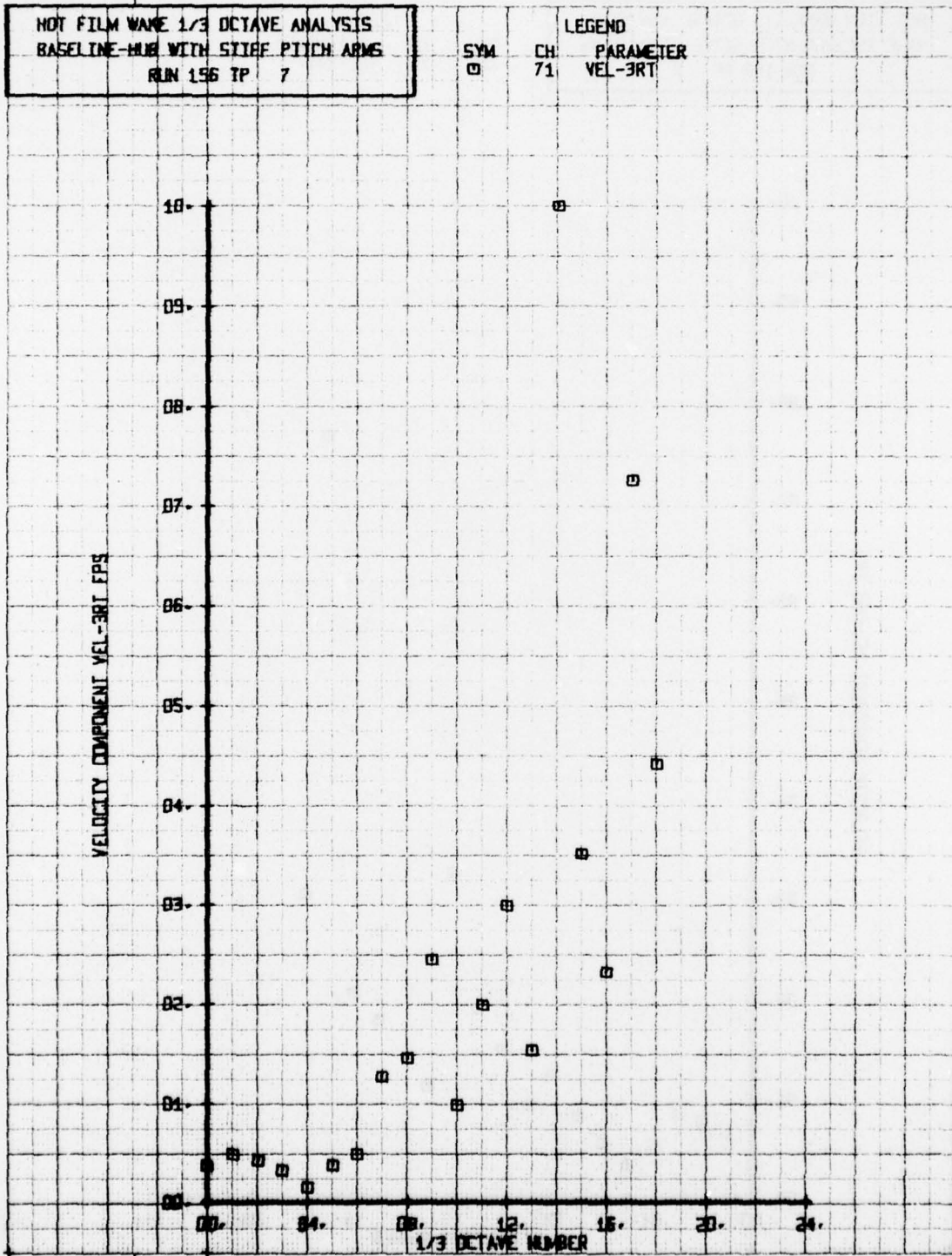


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 7

SYM
□

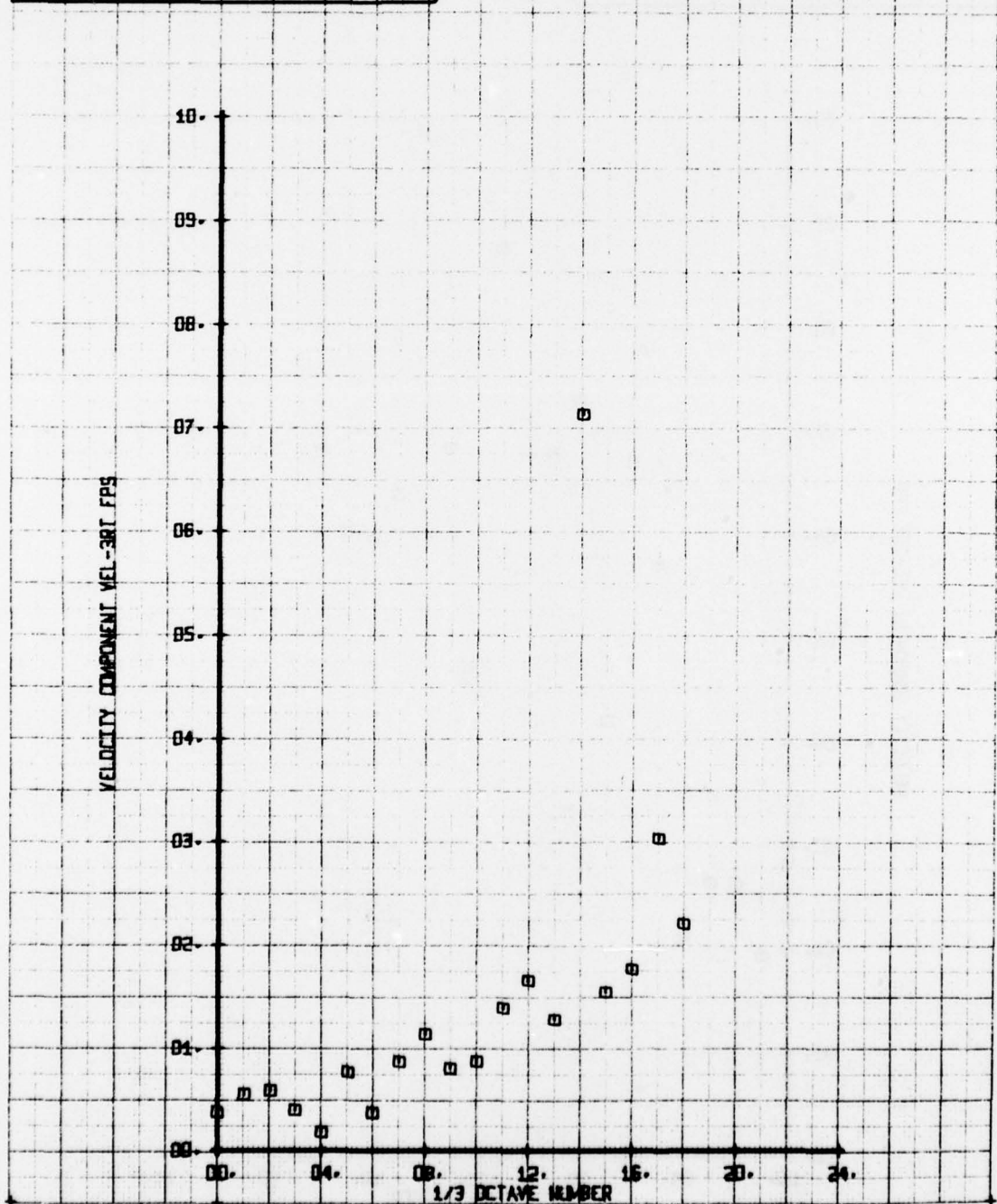
CH
71

LEGEND
PARAMETER
VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 8

SYN CH PARAMETER
0 71 VEL-3RT

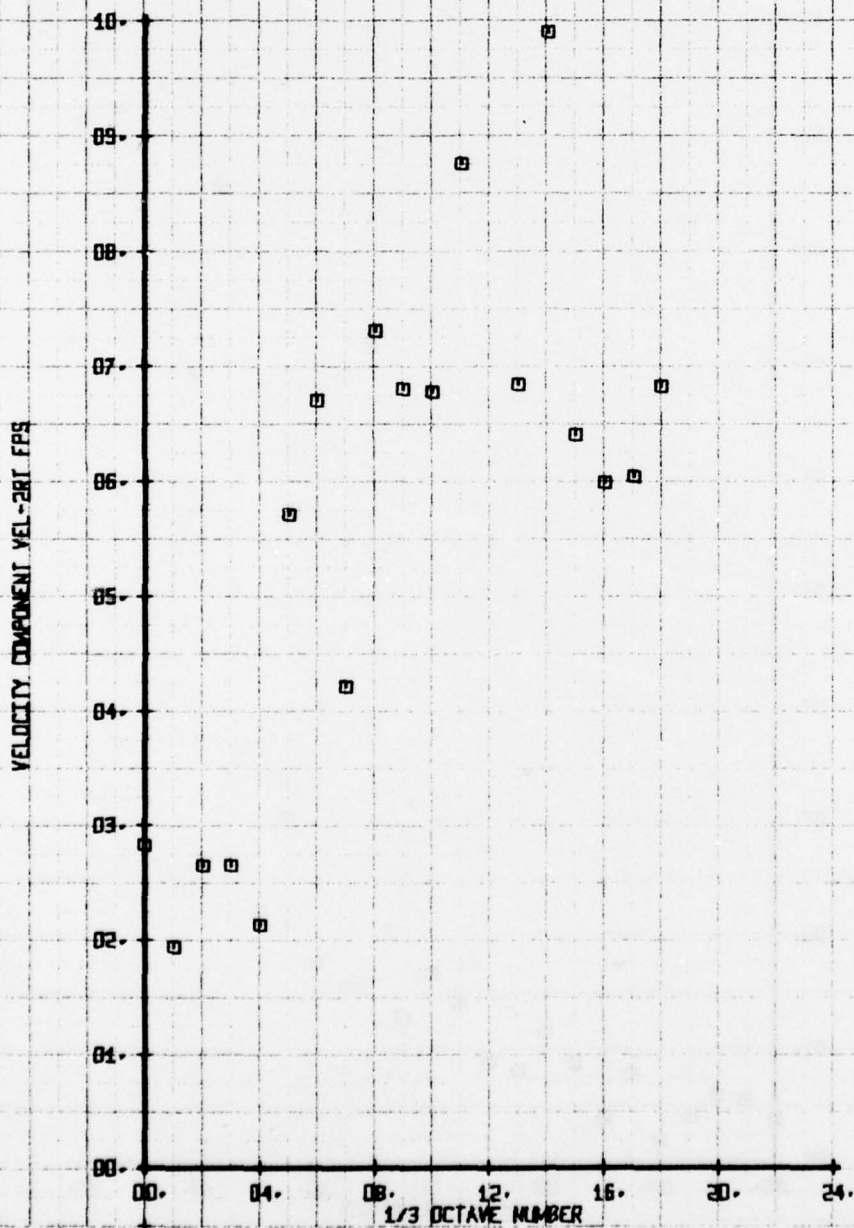


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIRRE PITCH ARMS
RUN 156 TP 2

SYM
□

CH
75

LEGEND
PARAMETER
VEL-2RT



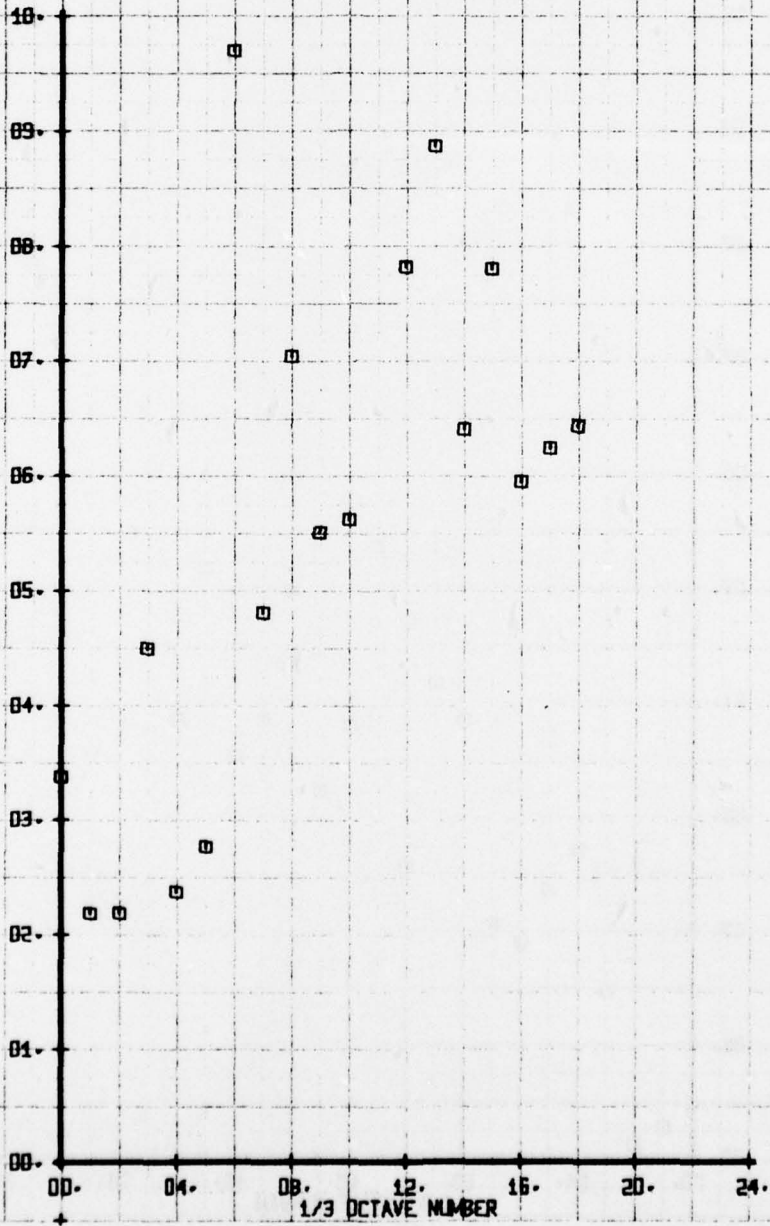
NOI FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 3

SYM
□

CH
75

LEGEND
PARAMETER
VEL-2RT

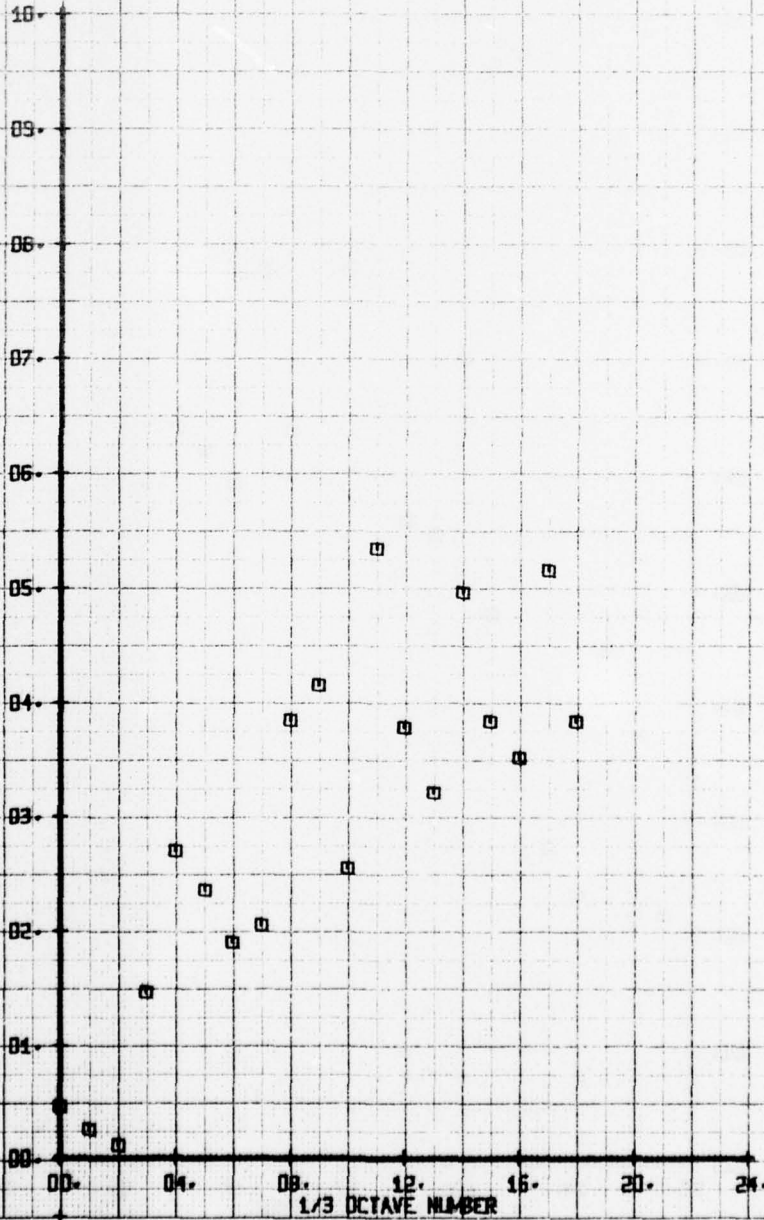
VELOCITY COMPONENT VEL-2RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 4

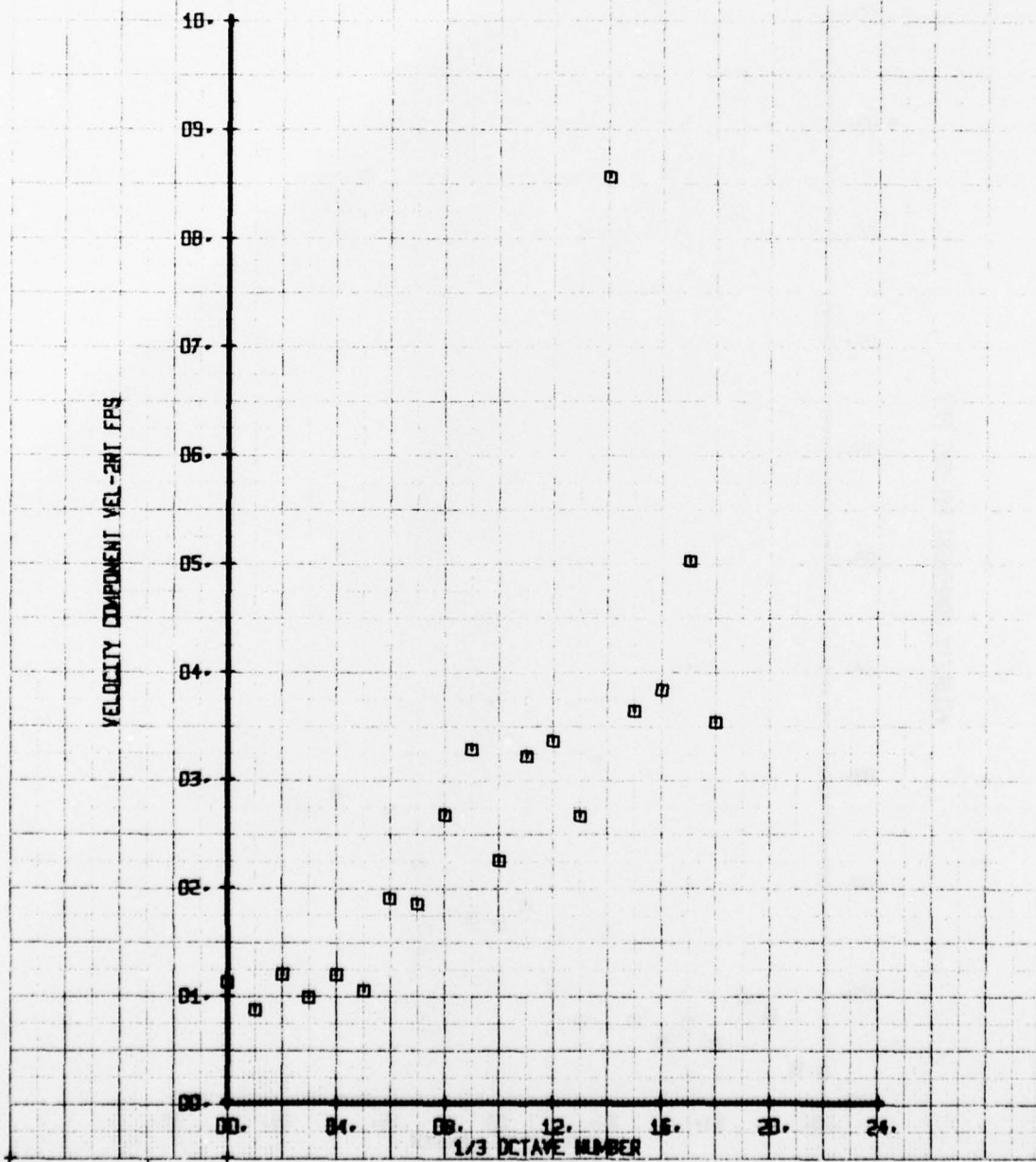
SYM	CH	PARAMETER
□	75	VEL-2RT

VELOCITY COMPONENT VEL-2RT FPS



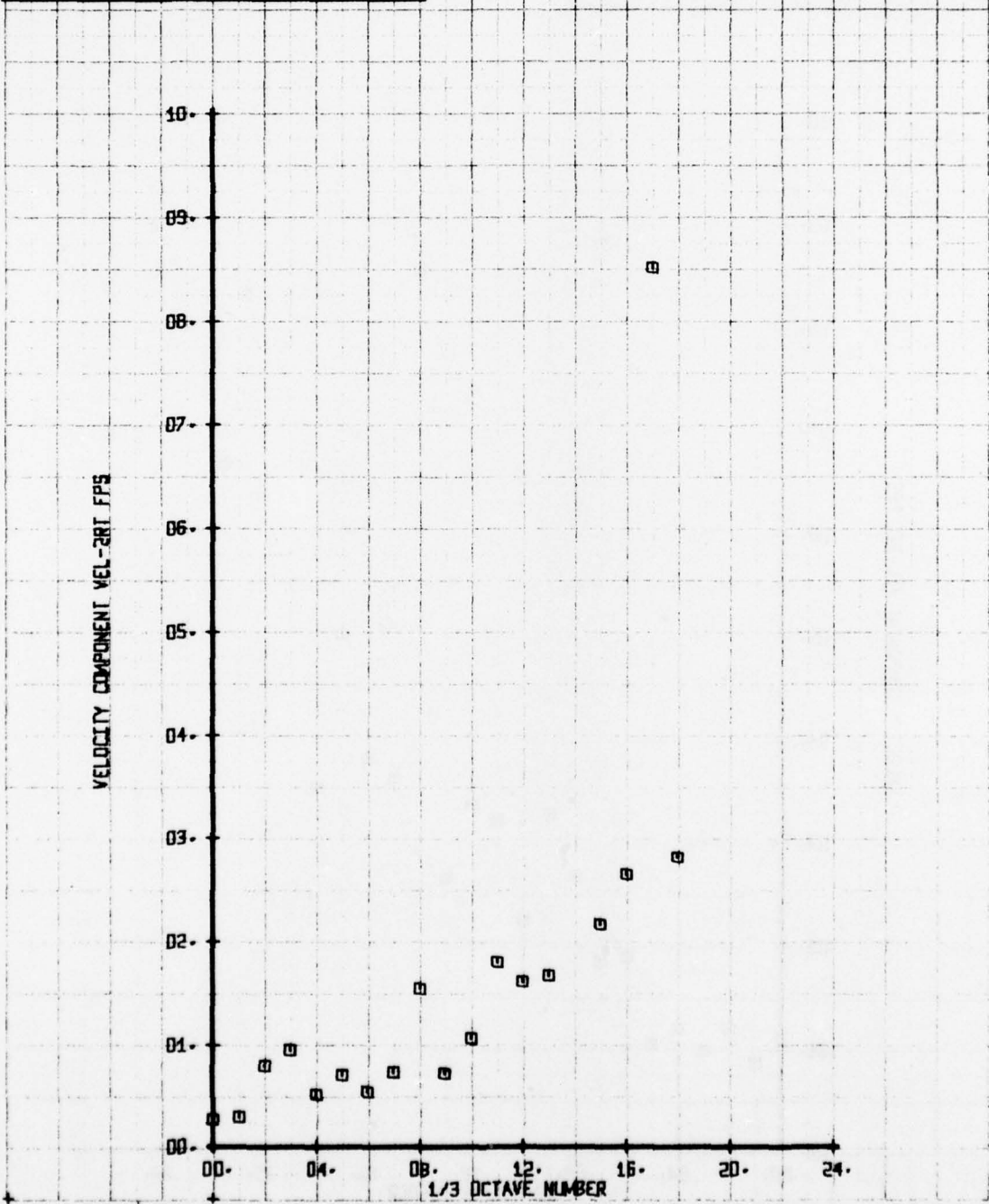
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 5

LEGEND
SYM CH PARAMETER
□ 75 VEL-2RT



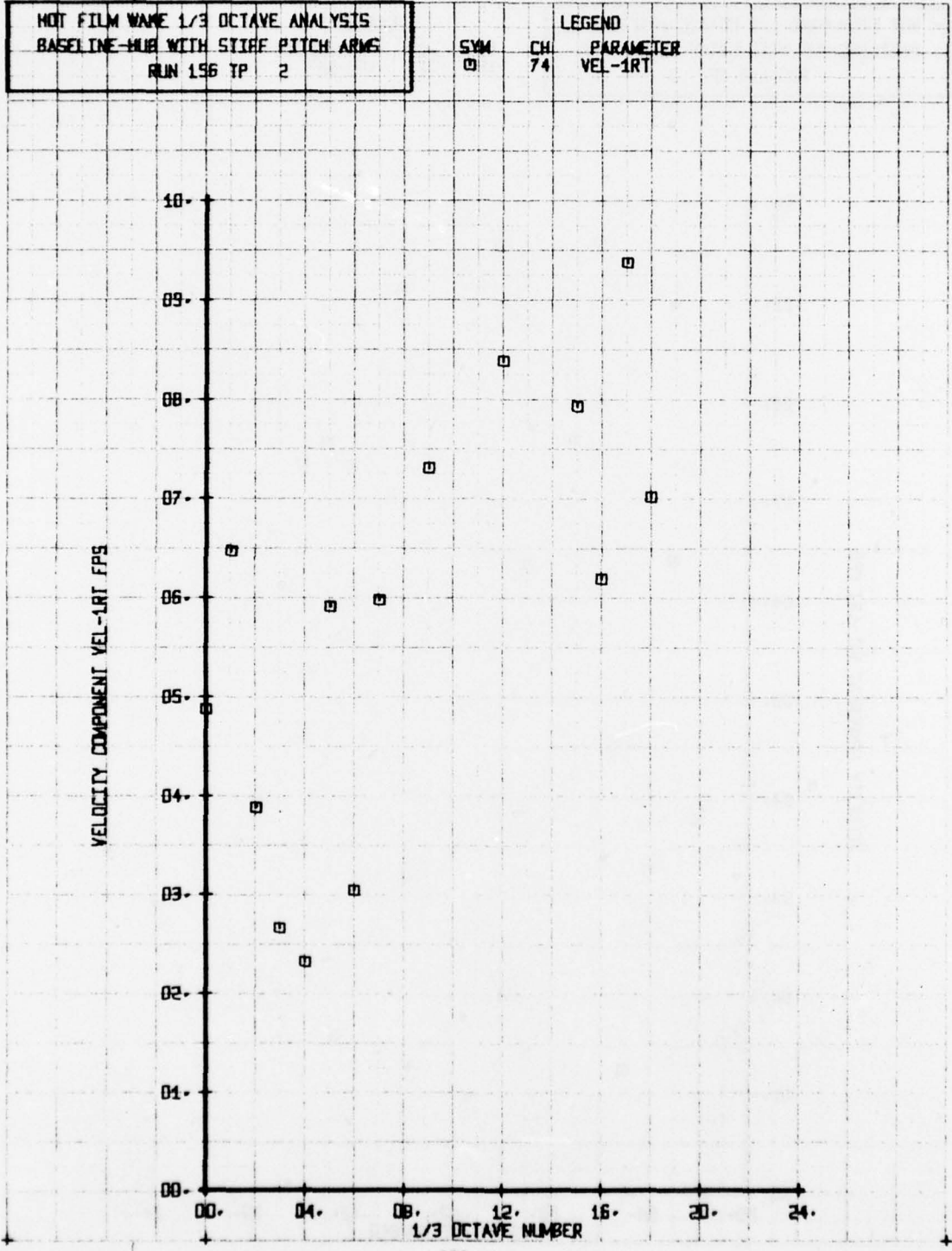
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 6

SYM	CH	LEGEND	PARAMETER
□	75		VEL-2RT



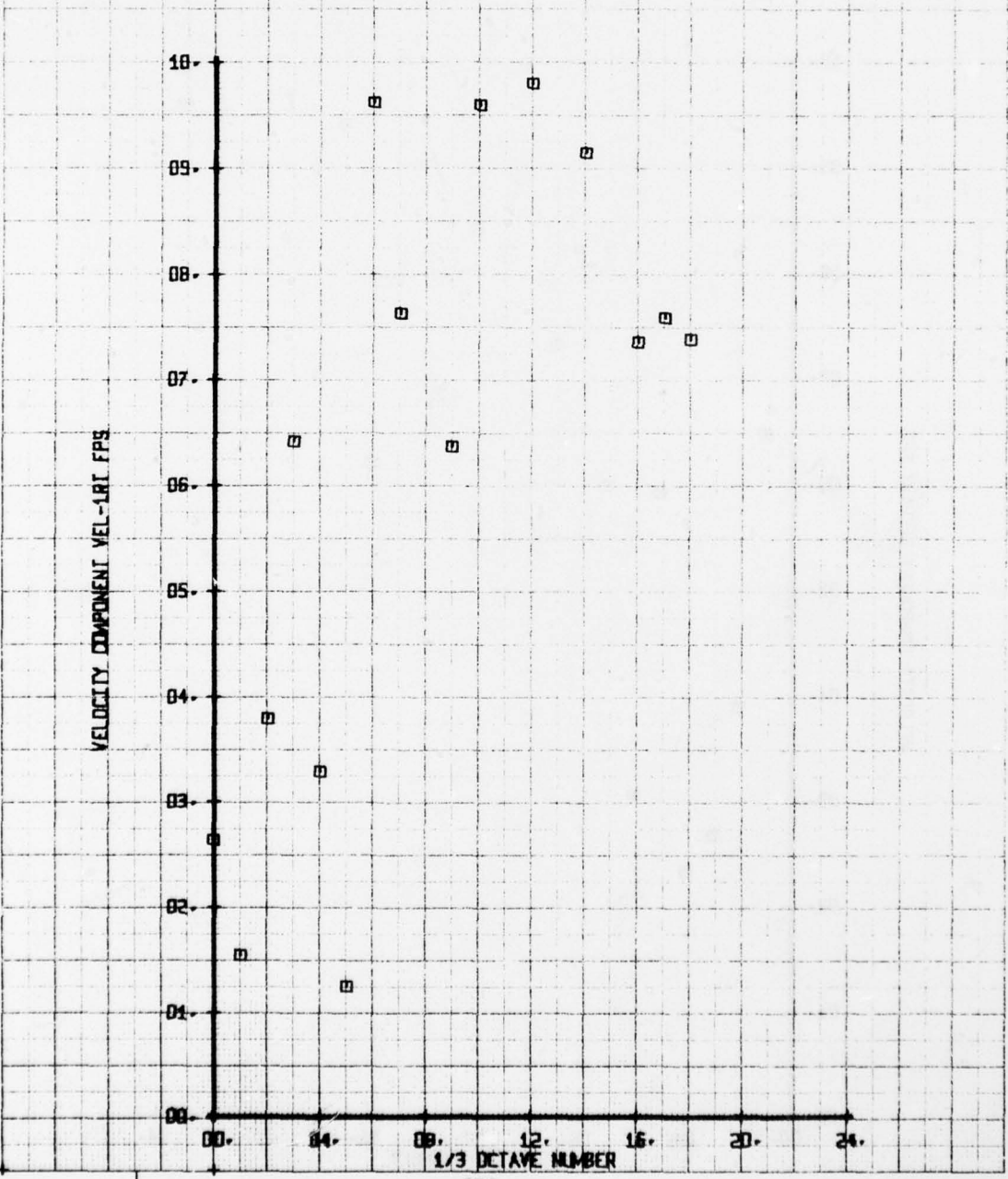
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 2

SYN CH PARAMETER
 0 74 VEL-1RT



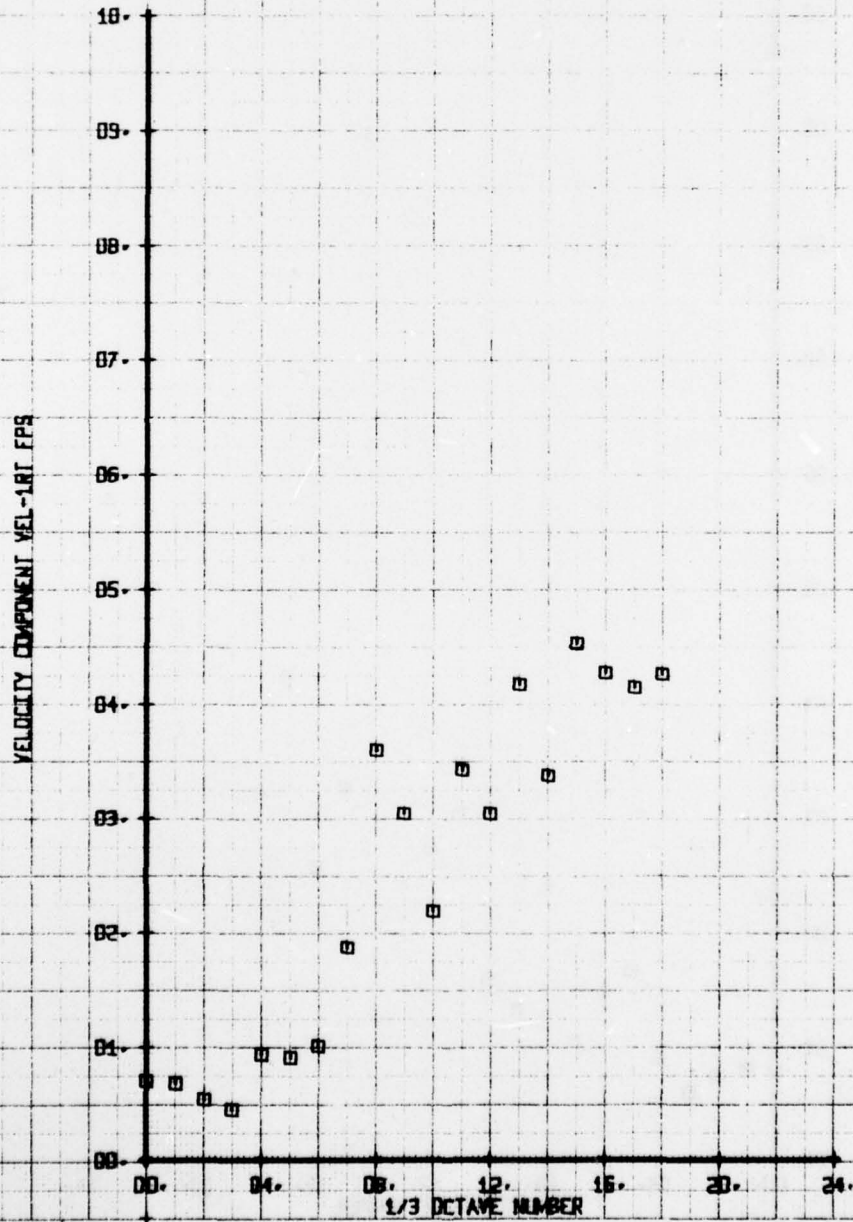
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 3

SYN CH PARAMETER
 □ 74 VEL-1RT



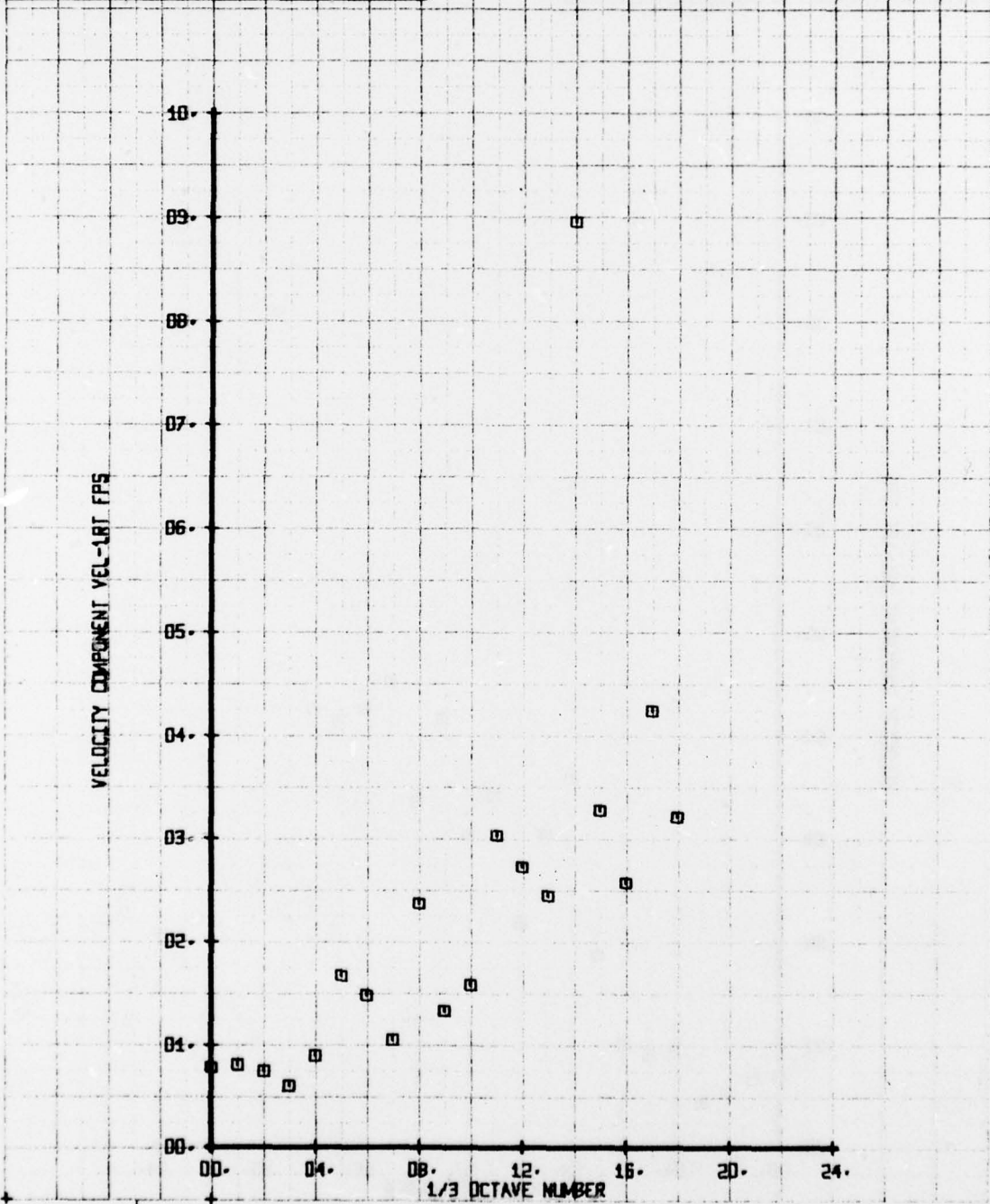
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 4

SYN CH PARAMETER
□ 74 VEL-1RT



HDI FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 5

SYM	CH	PARAMETER
□	74	VEL-1RT



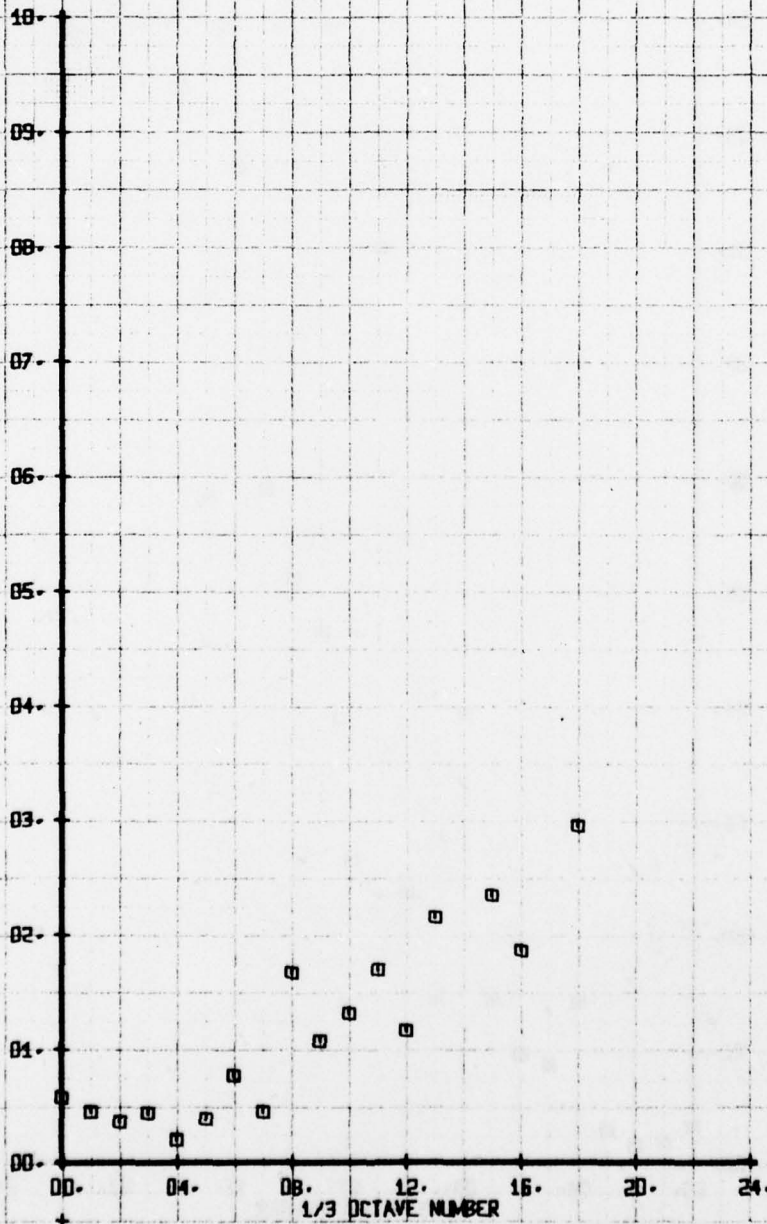
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 6

SYM
□

CH
74

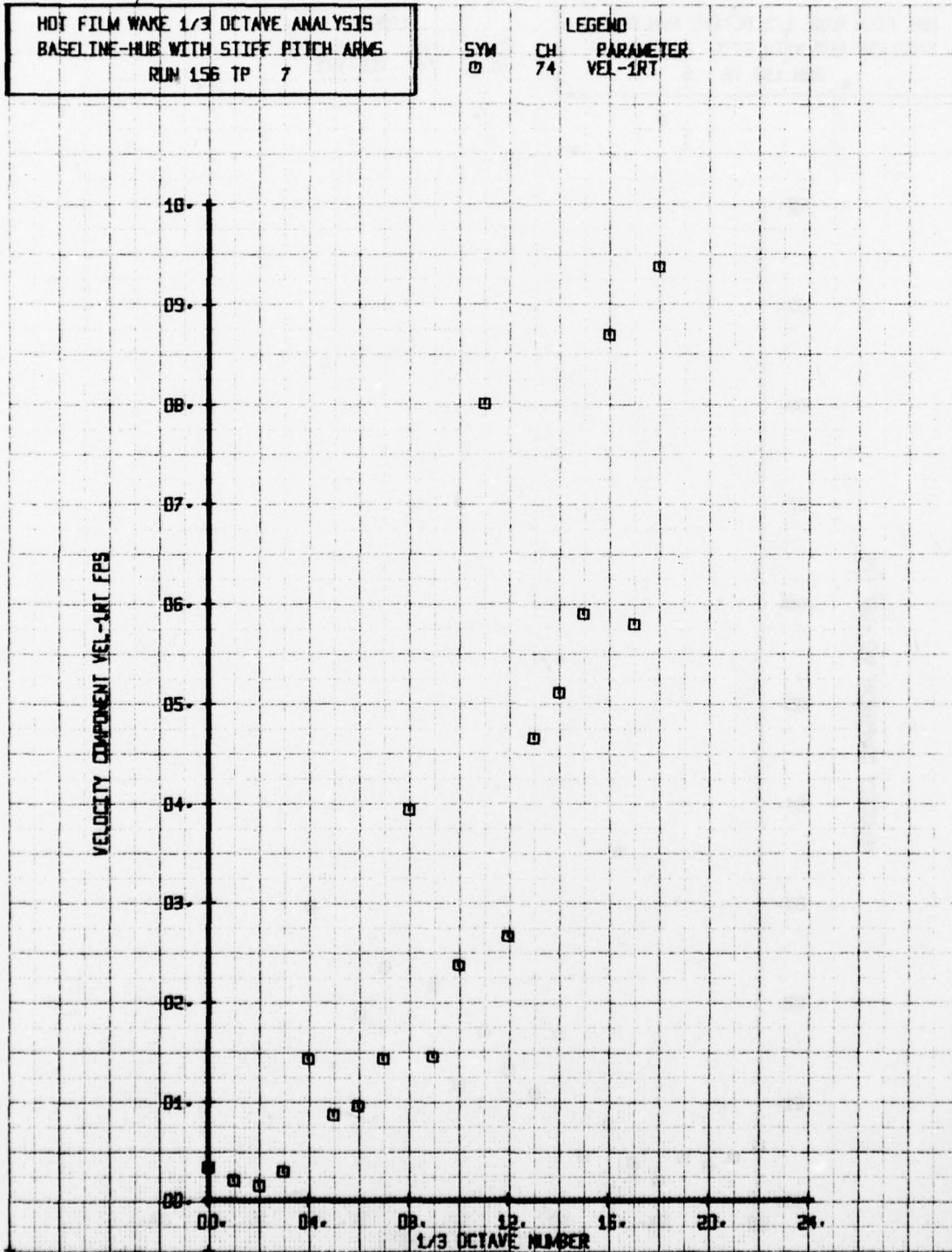
LEGEND
PARAMETER
VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



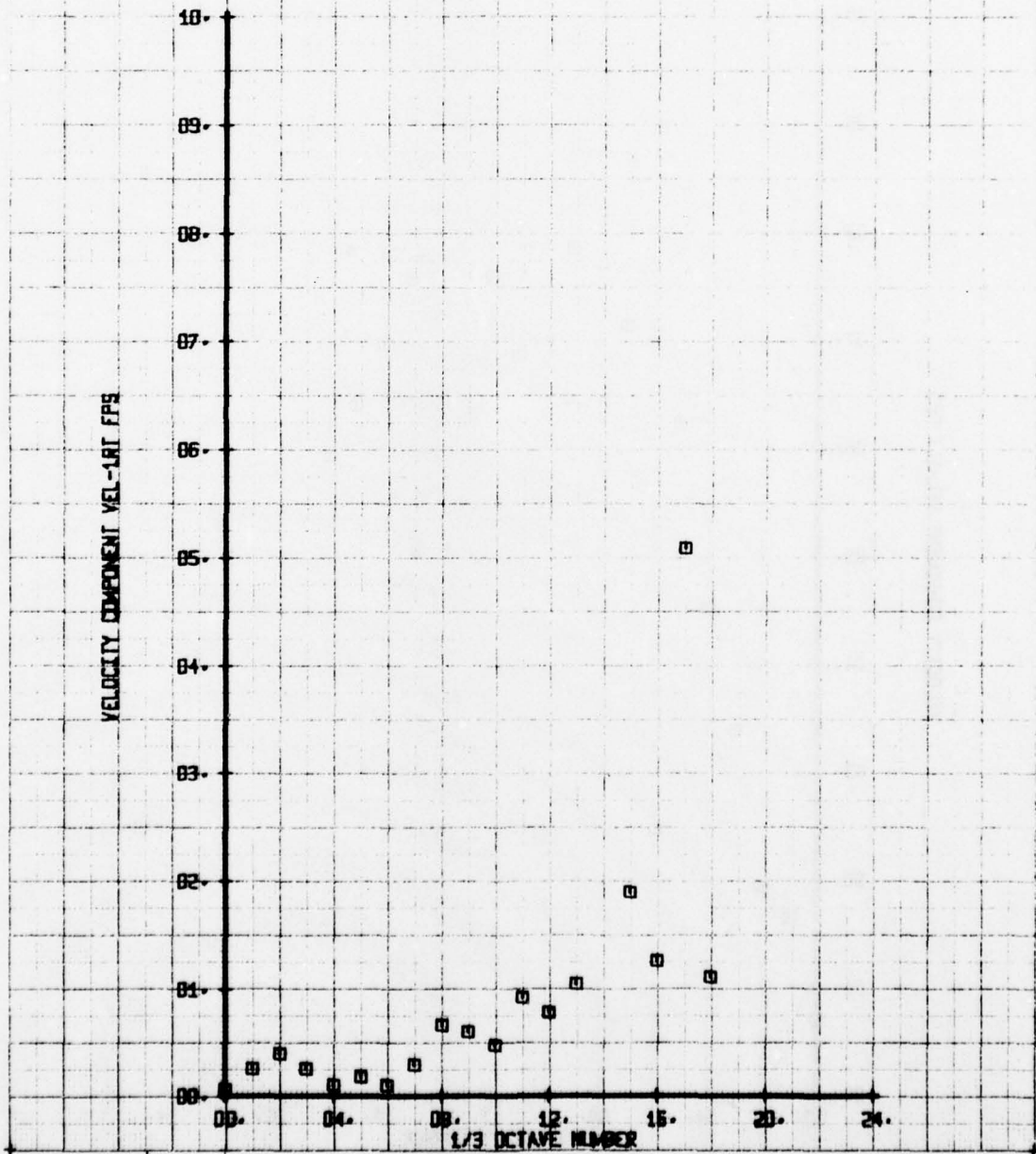
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUM 156 TP 7

SYM	CH	PARAMETER
□	74	VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 8

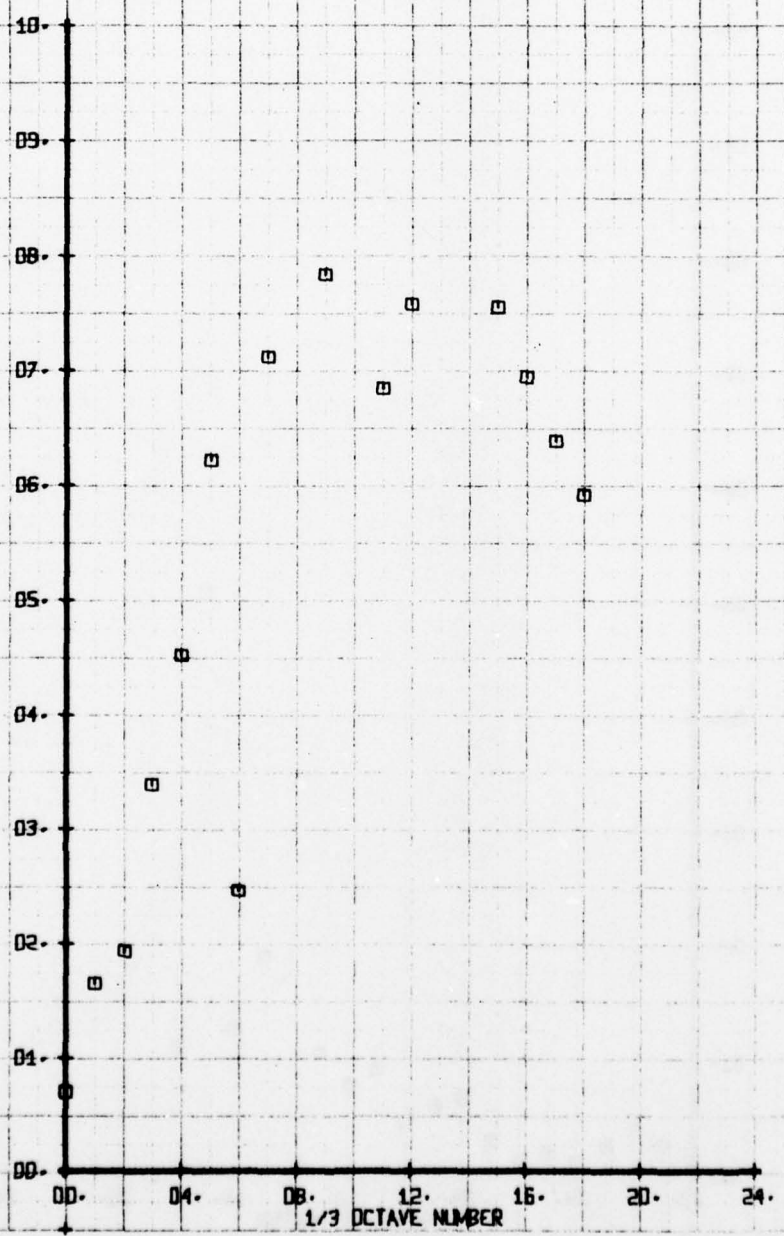
LEGEND
SYM CH PARAMETER
□ 74 VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 2

SYM	CH	PARAMETER
□	73	VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



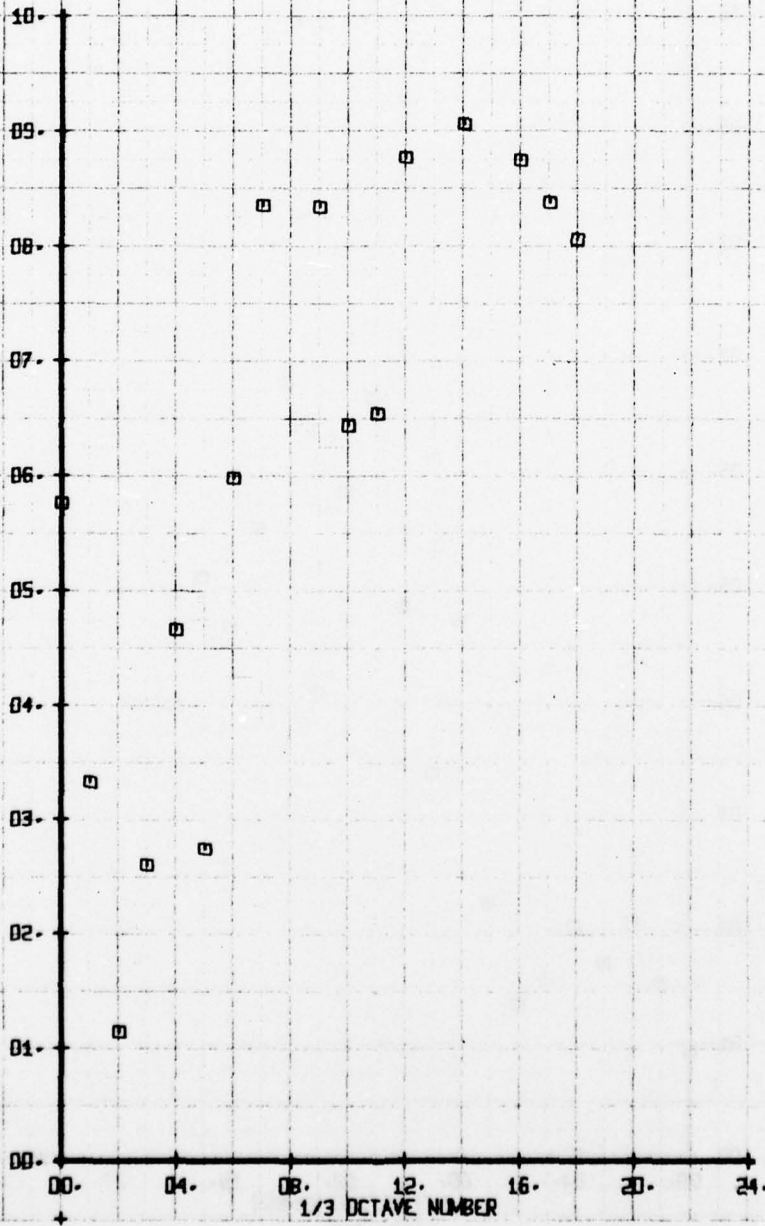
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 3

SYM
□

CH
73

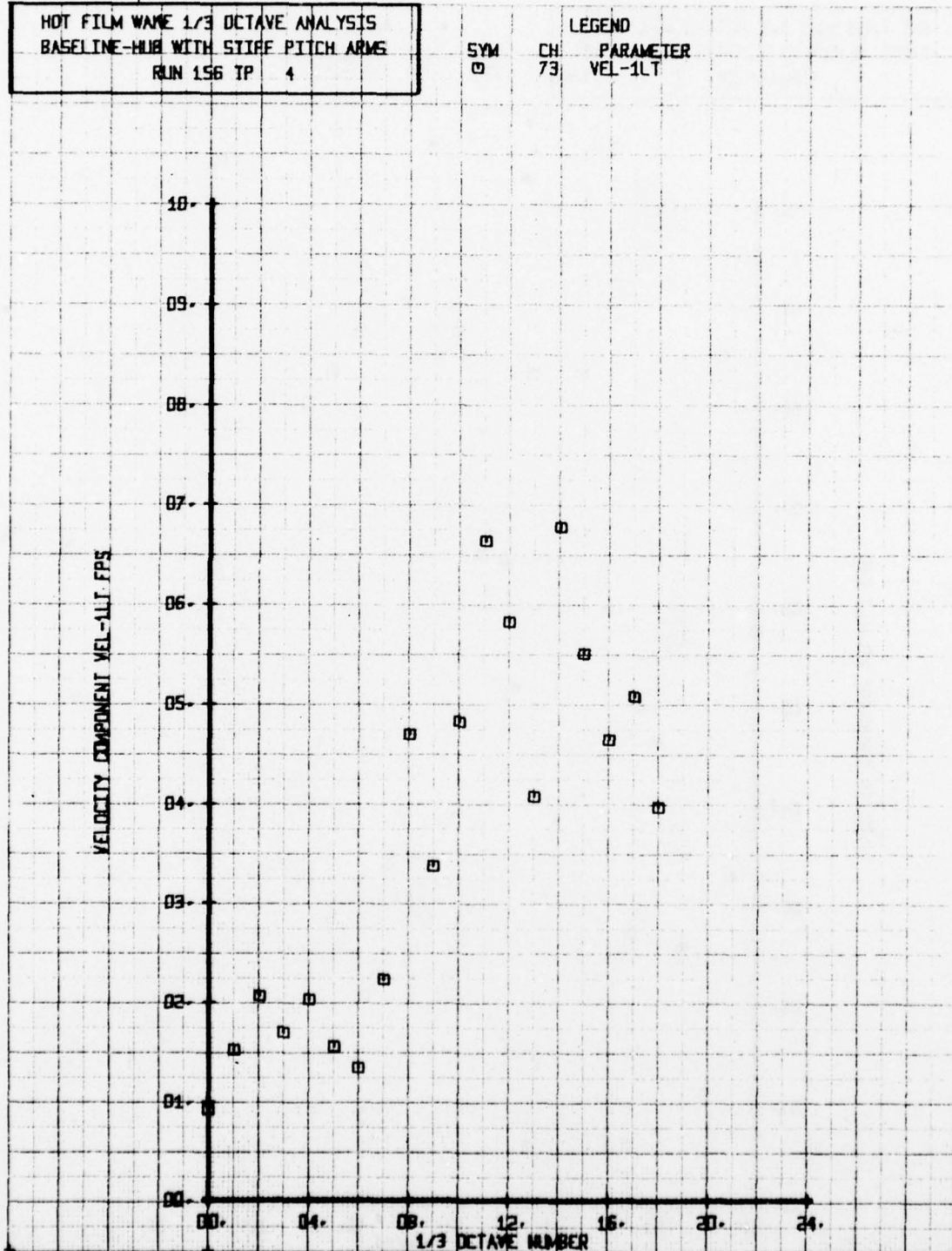
LEGEND
PARAMETER
VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS



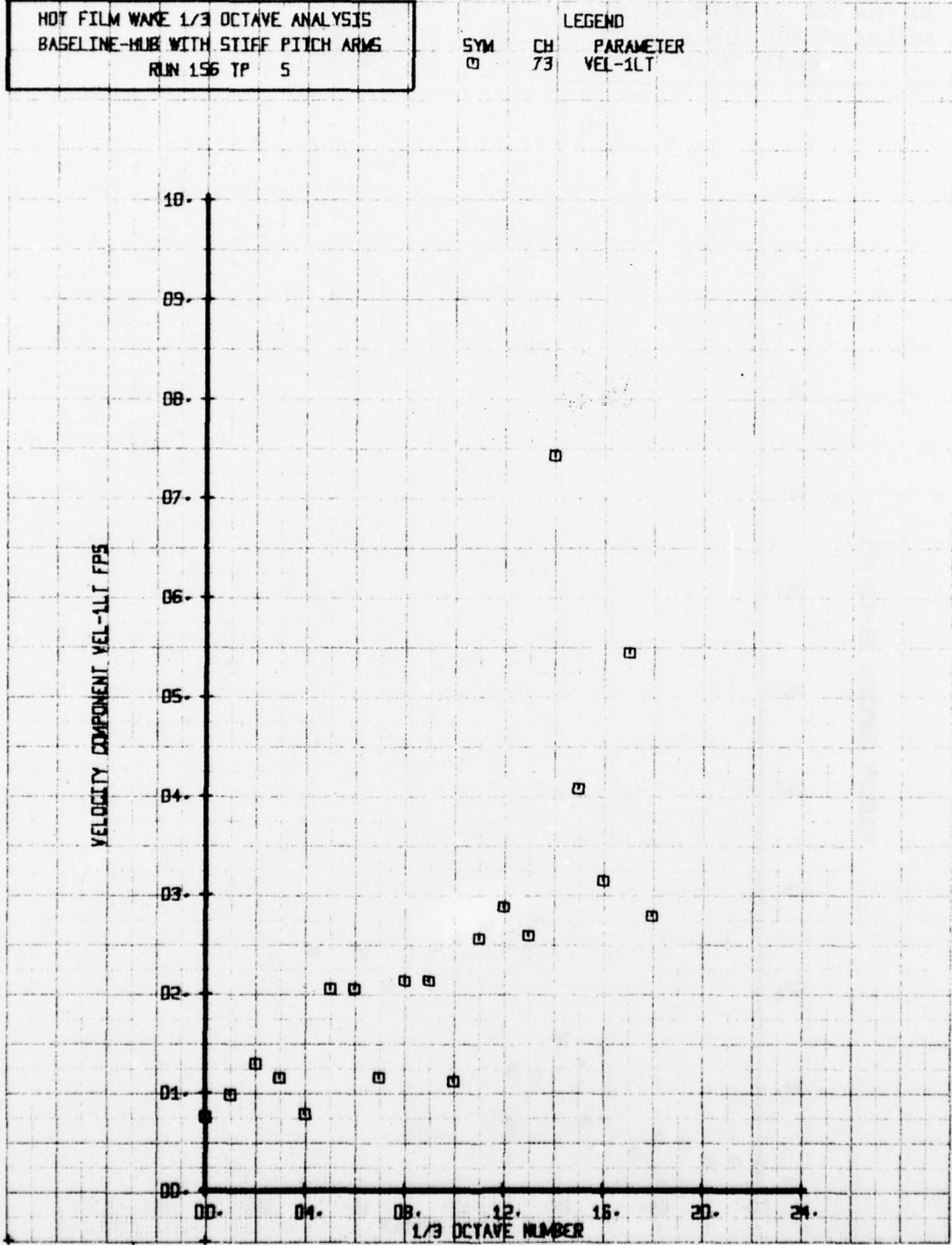
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 IP 4

SYM CH PARAMETER
□ 73 VEL-1LT



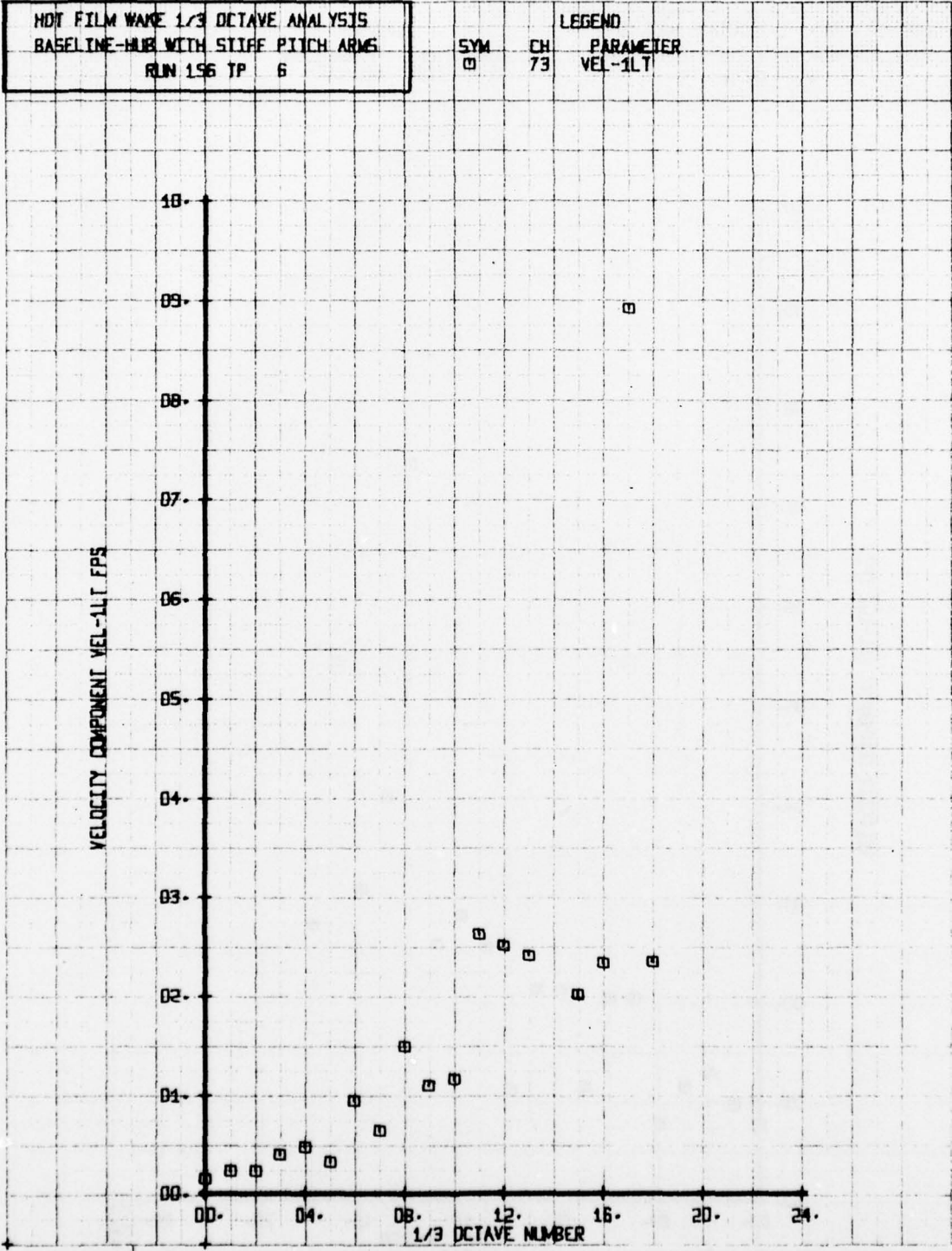
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 5

SYM	CH	PARAMETER
□	73	VEL-1LT



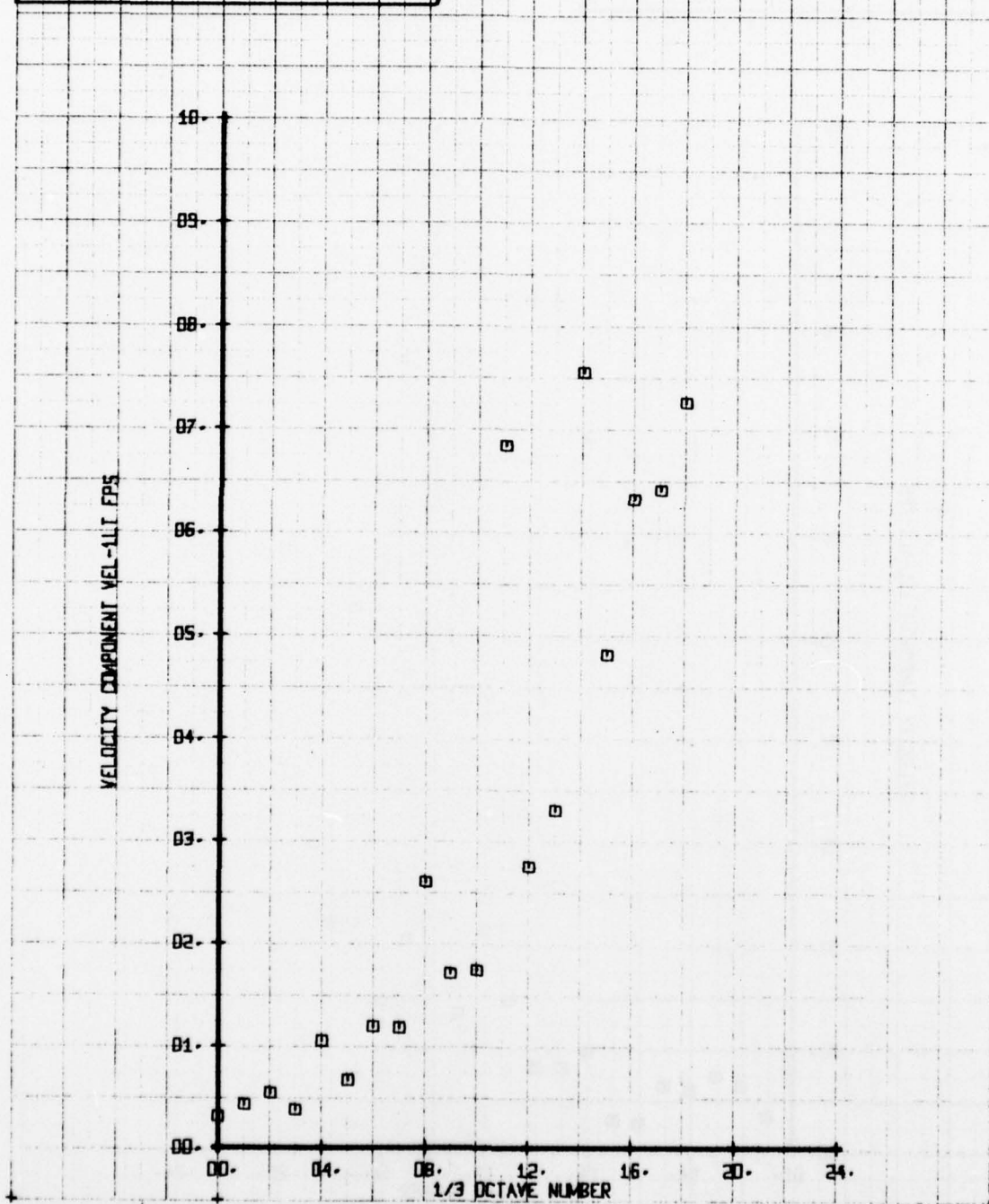
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 6

SYM	CH	PARAMETER
□	73	VEL-1LT



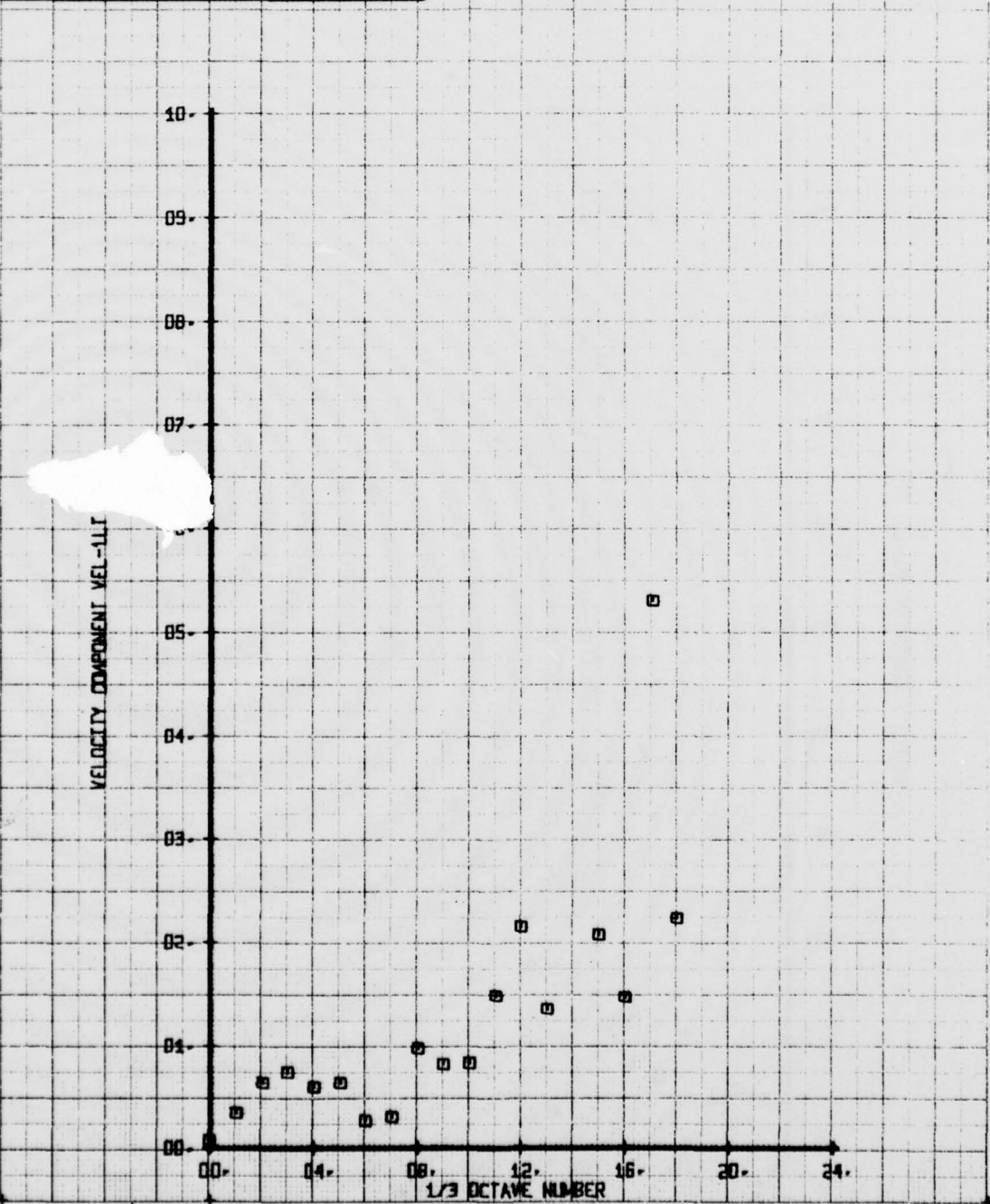
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 7

SYM	CH	PARAMETER
□	73	VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 196 TP B

SYM CH PARAMETER
□ 73 VEL-1LT

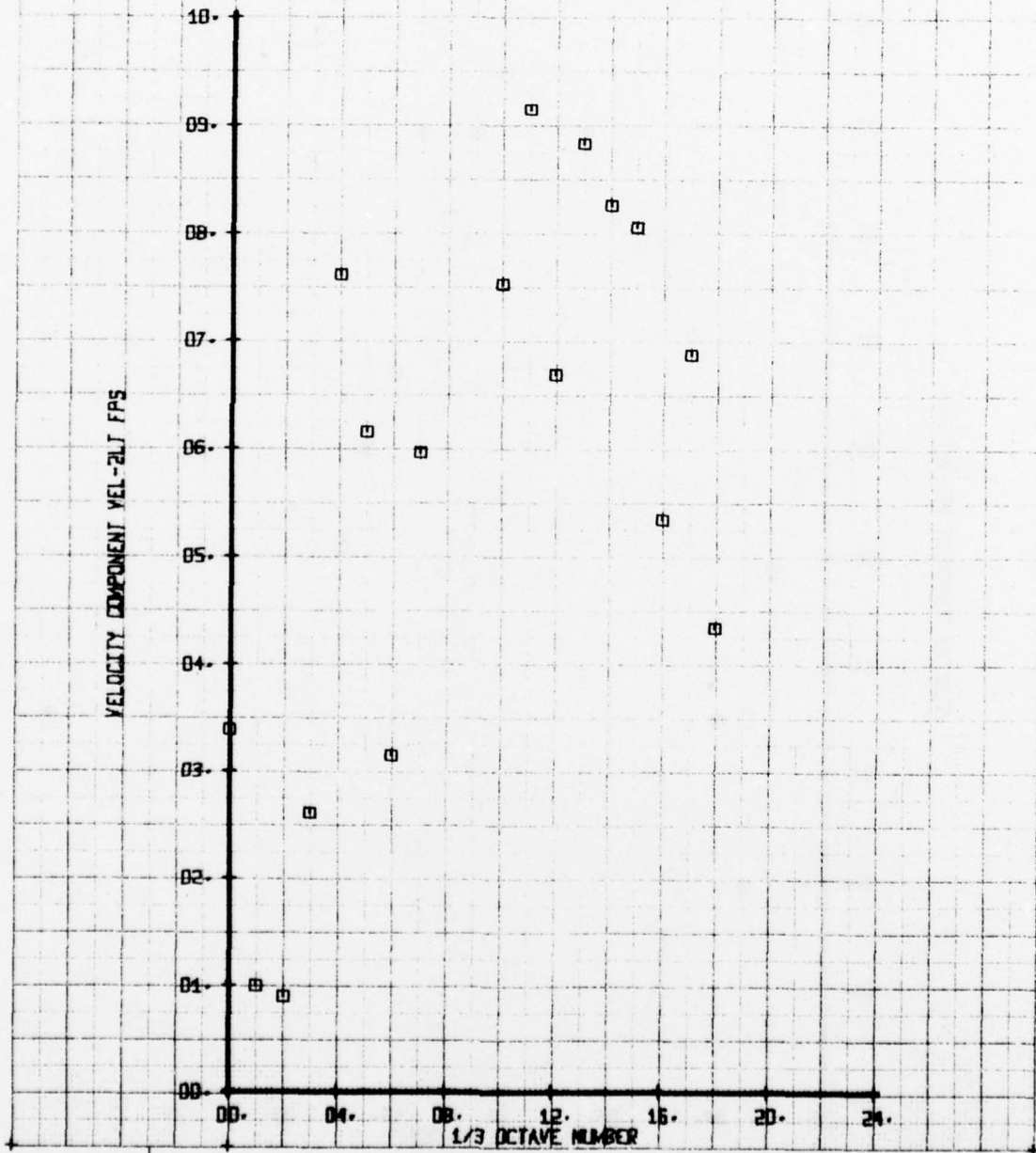


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 2

SYM
□

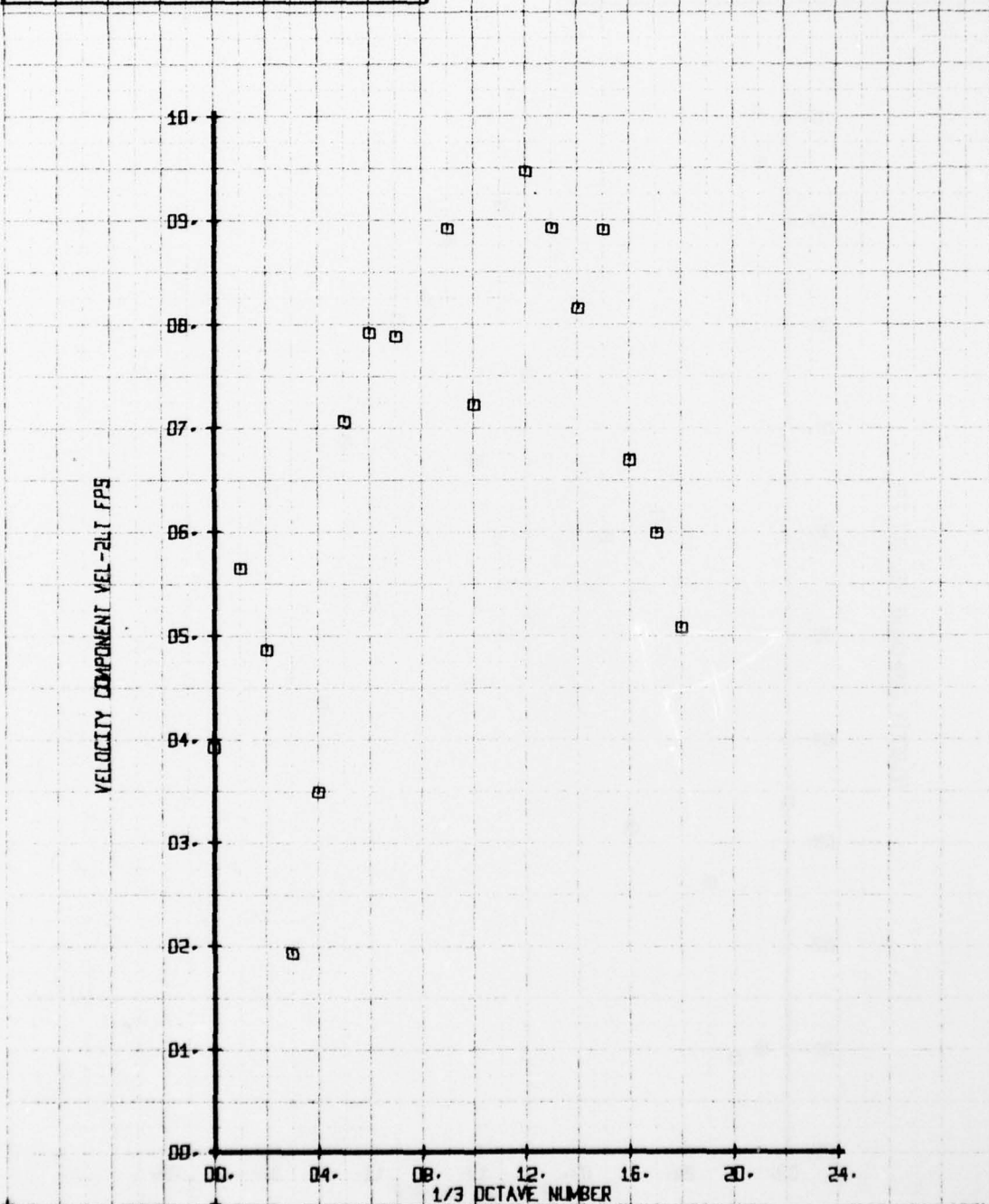
CH
72

LEGEND
PARAMETER
VEL-2LT



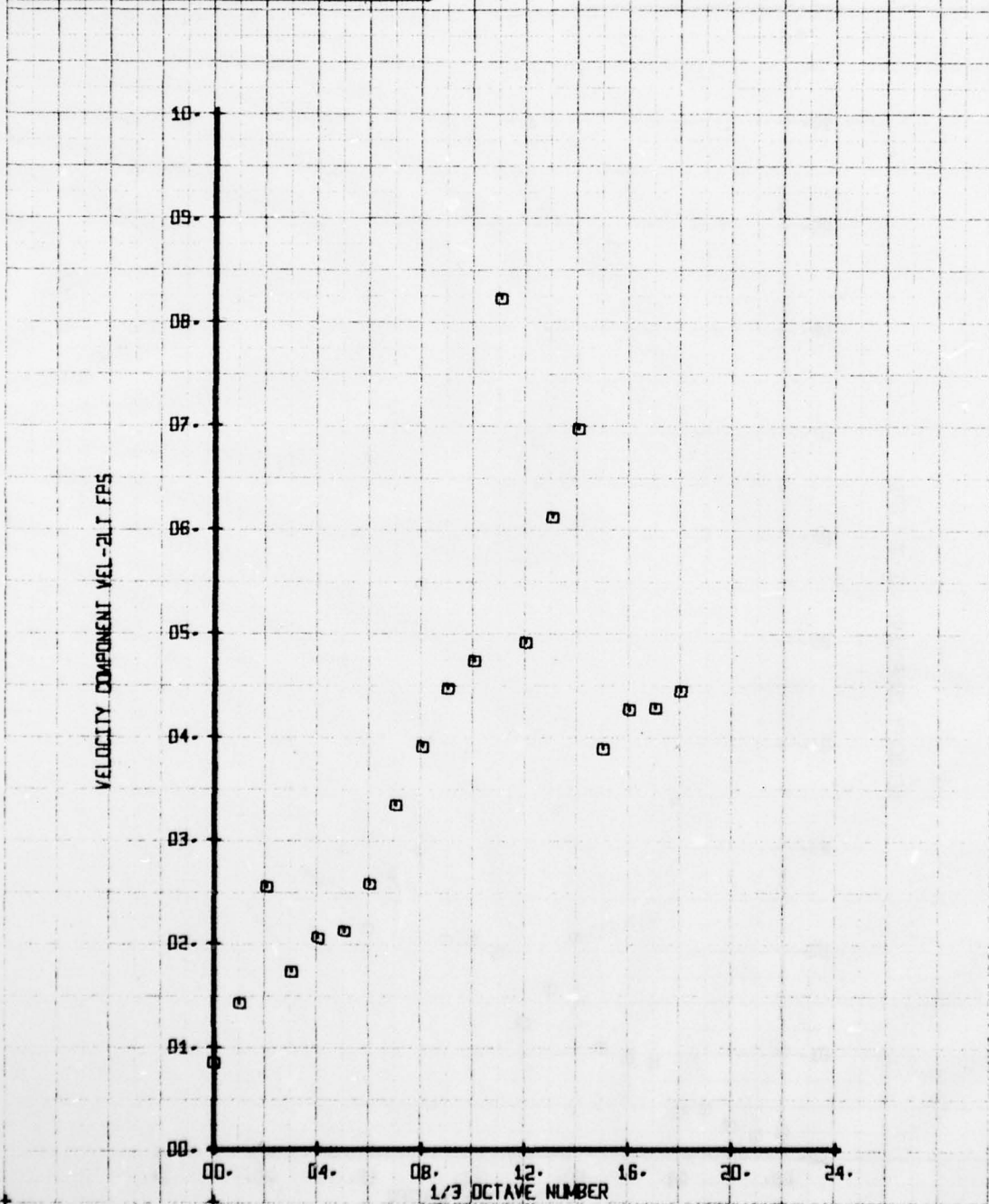
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 3

LEGEND
 SYM CH PARAMETER
 □ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 4

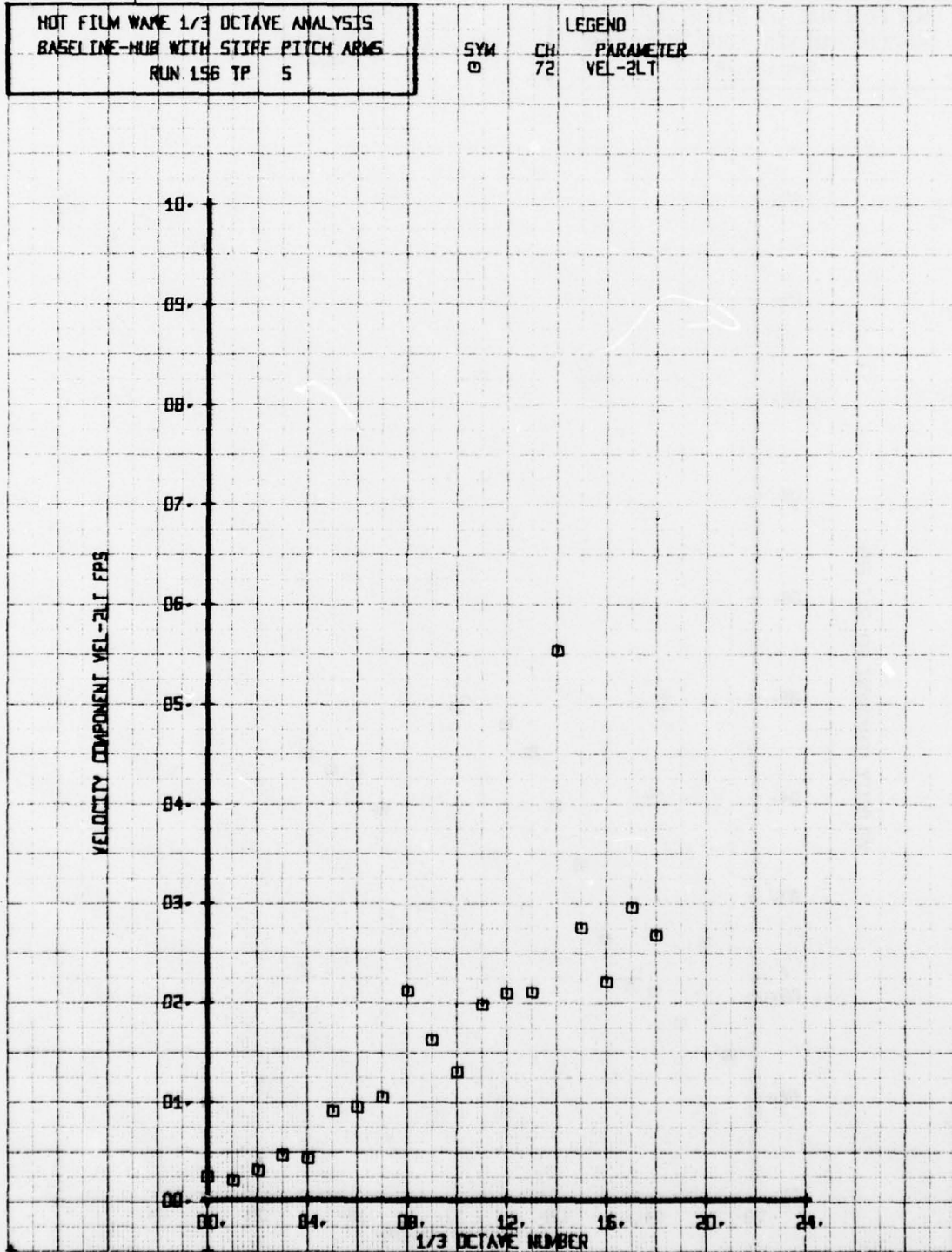
SYM CH PARAMETER
□ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 196 TP 5

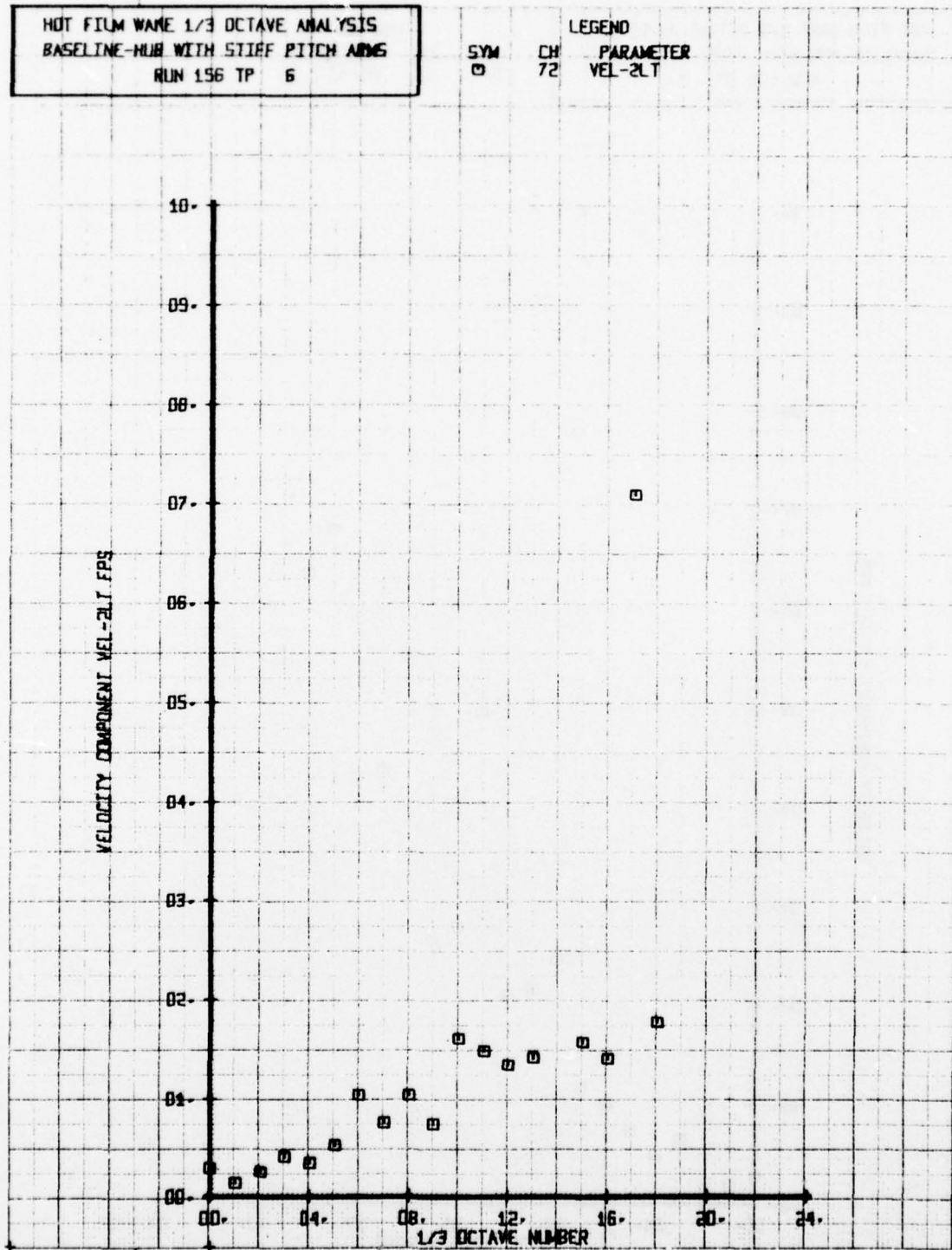
SYN CH. PARAMETER
□ 72 VEL-2LT

VELOCITY COMPONENT VEL-2LT EPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 6

SYM	CH	PARAMETER
□	72	VEL-2LT



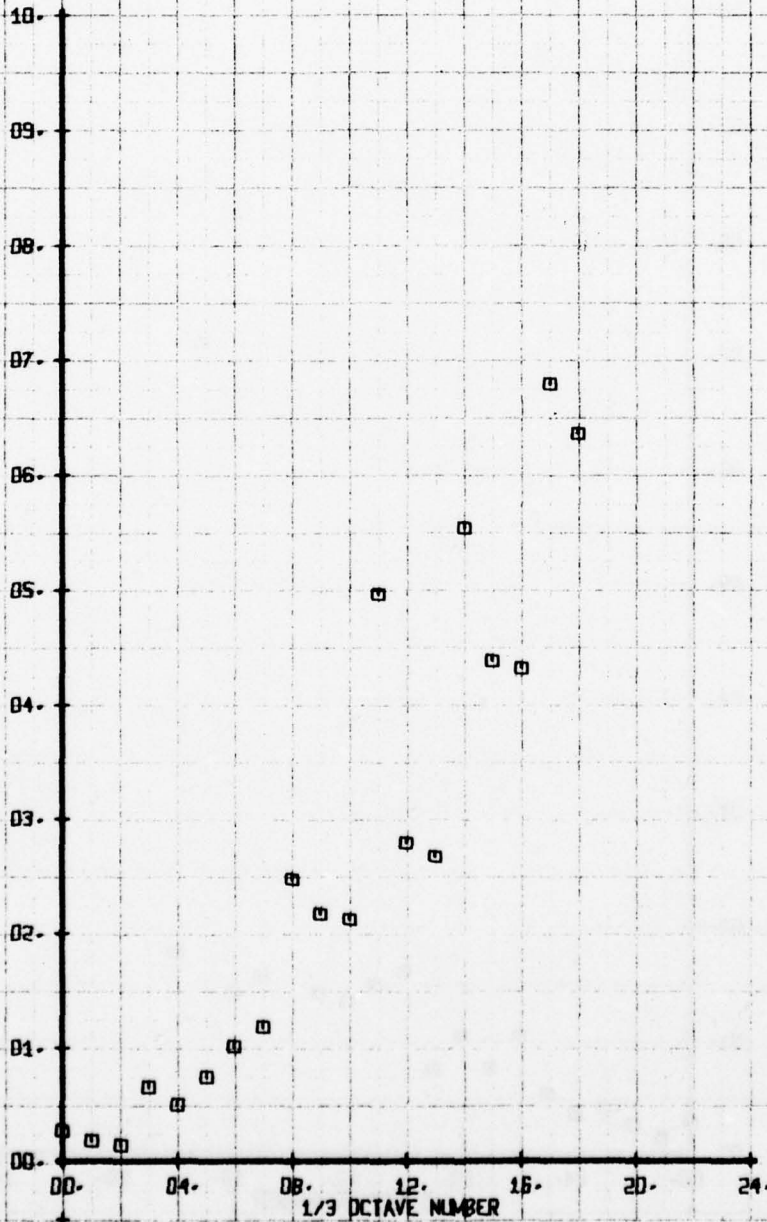
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 7

SYM
□

CH
72

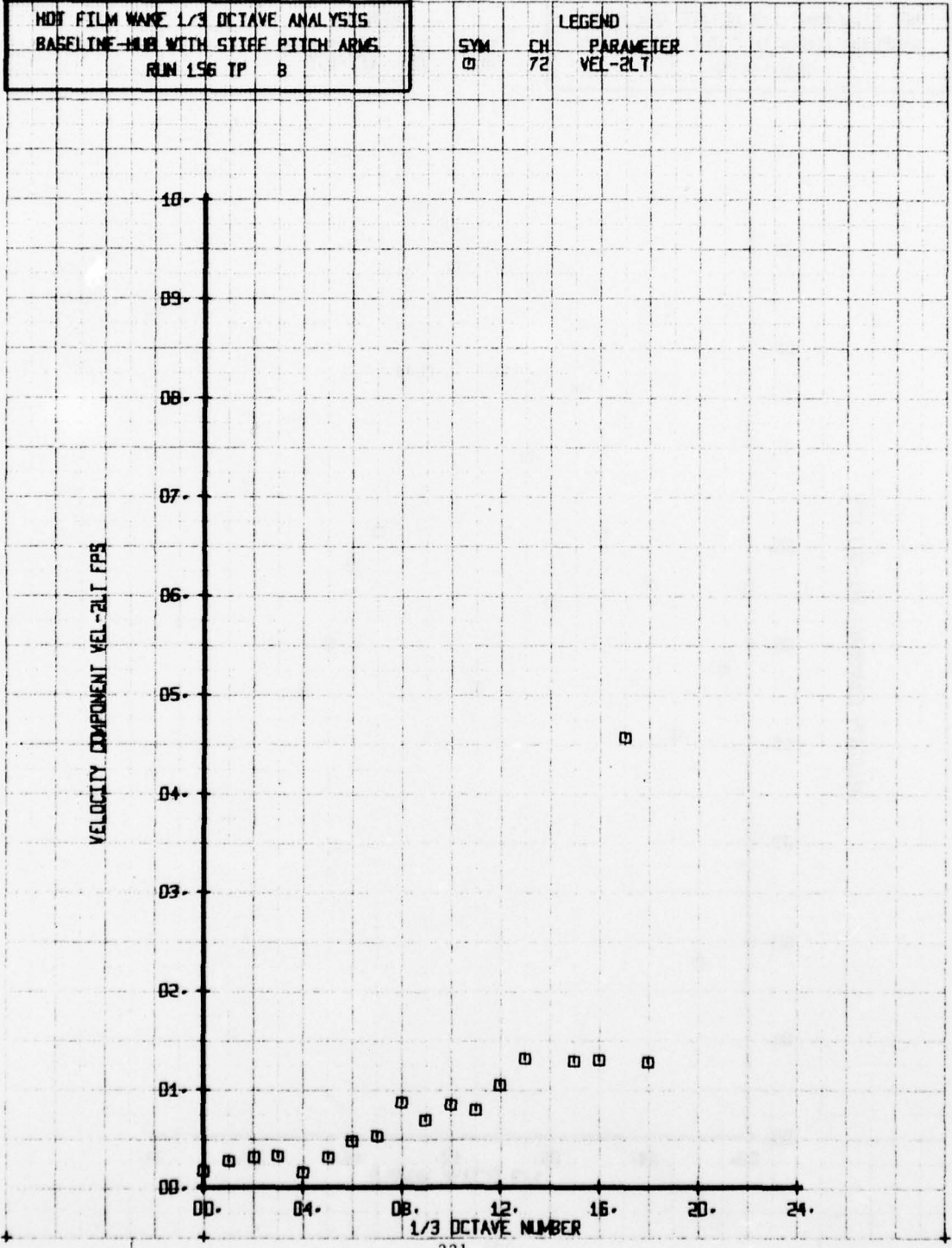
LEGEND
PARAMETER
VEL-2LT

VELOCITY COMPONENT VEL-2LT FPS



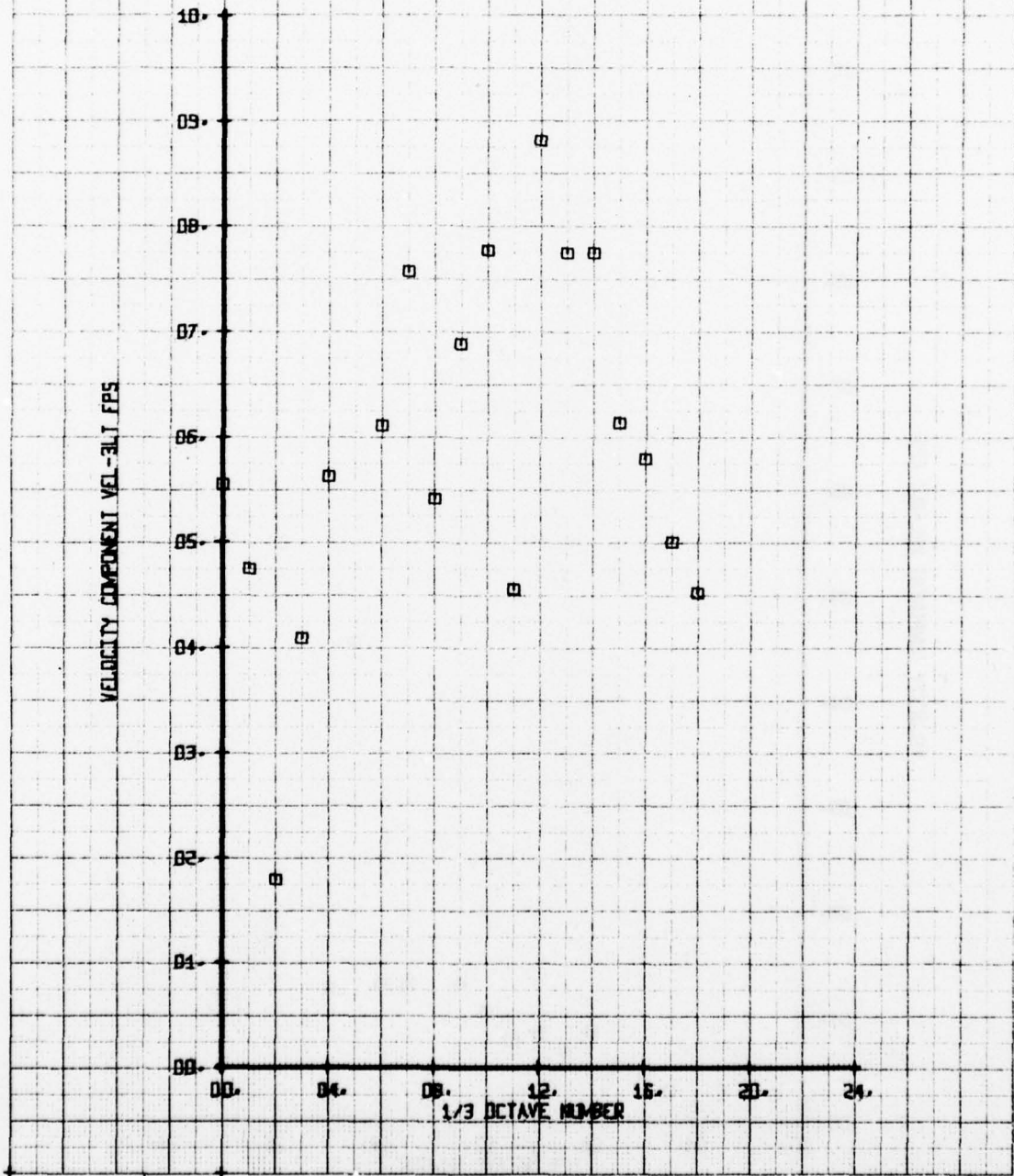
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 8

SYM	CH	PARAMETER
□	72	VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-HUB WITH STIFF PITCH ARMS
RUN 156 TP 2

LEGEND
SYM CH PARAMETER
□ 70 VEL-3LT

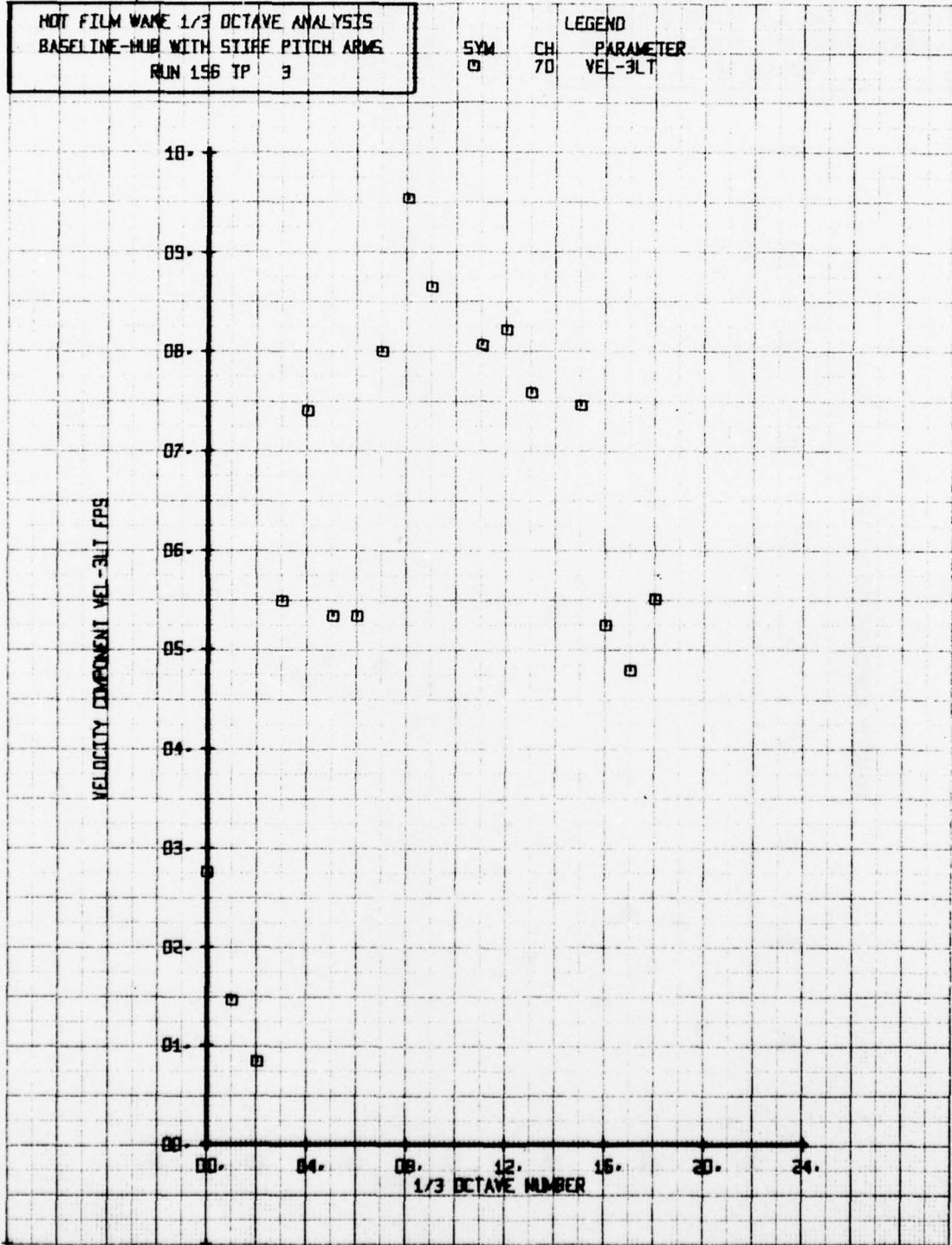


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 3

SYM
 □

CH
 70

LEGEND
 PARAMETER
 VEL-3LT

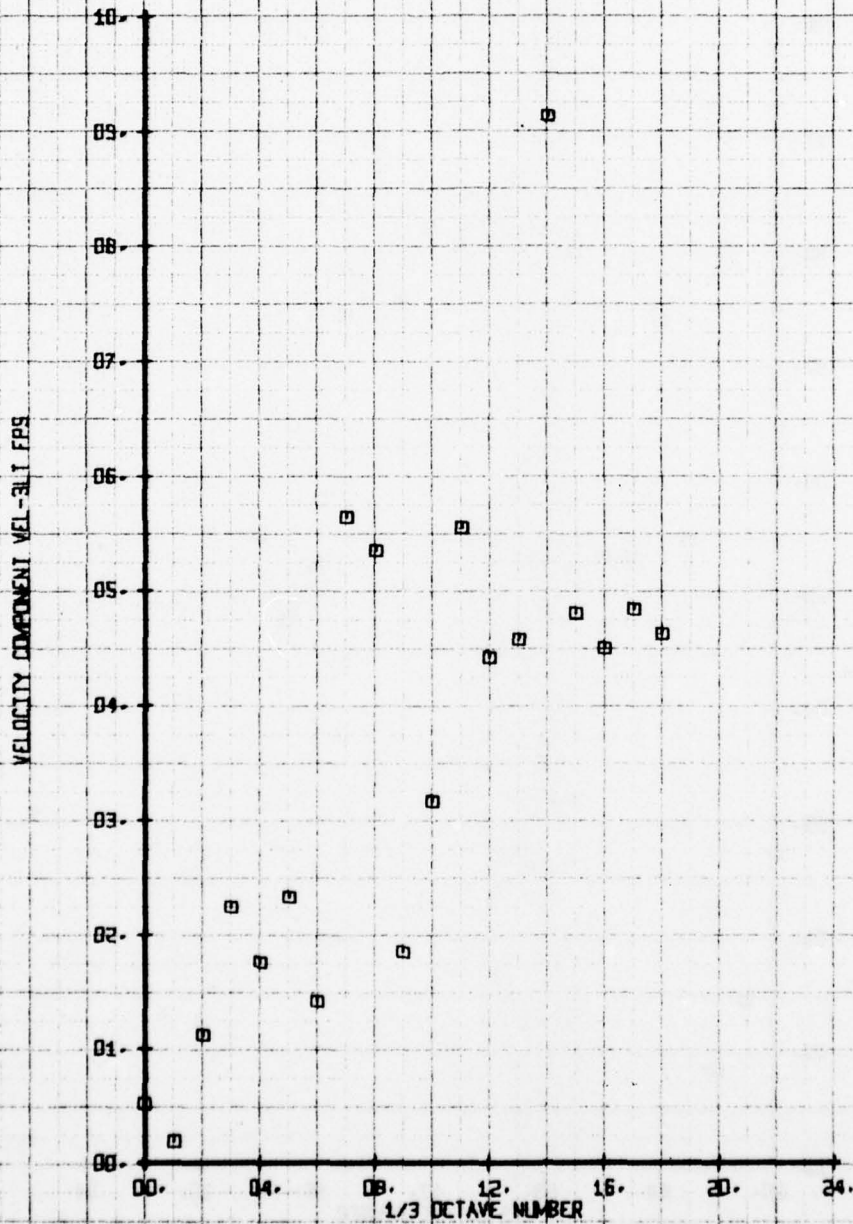


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-HUB WITH STIFF PITCH ARMS
 RUN 156 TP 4

SYM
 □

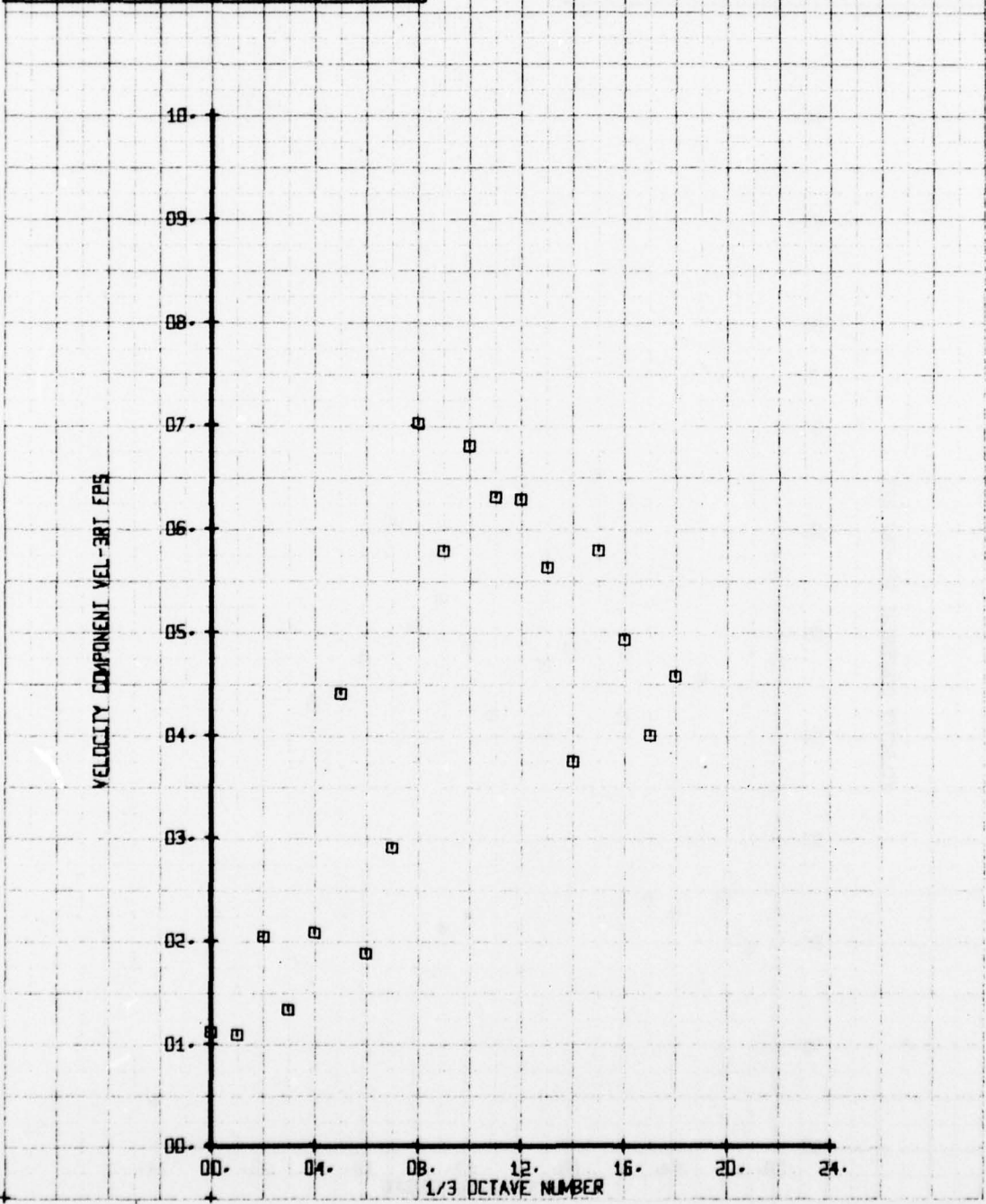
CH
 70

LEGEND
 PARAMETER
 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 2

SYM CH PARAMETER
 □ 71 VEL-3RT

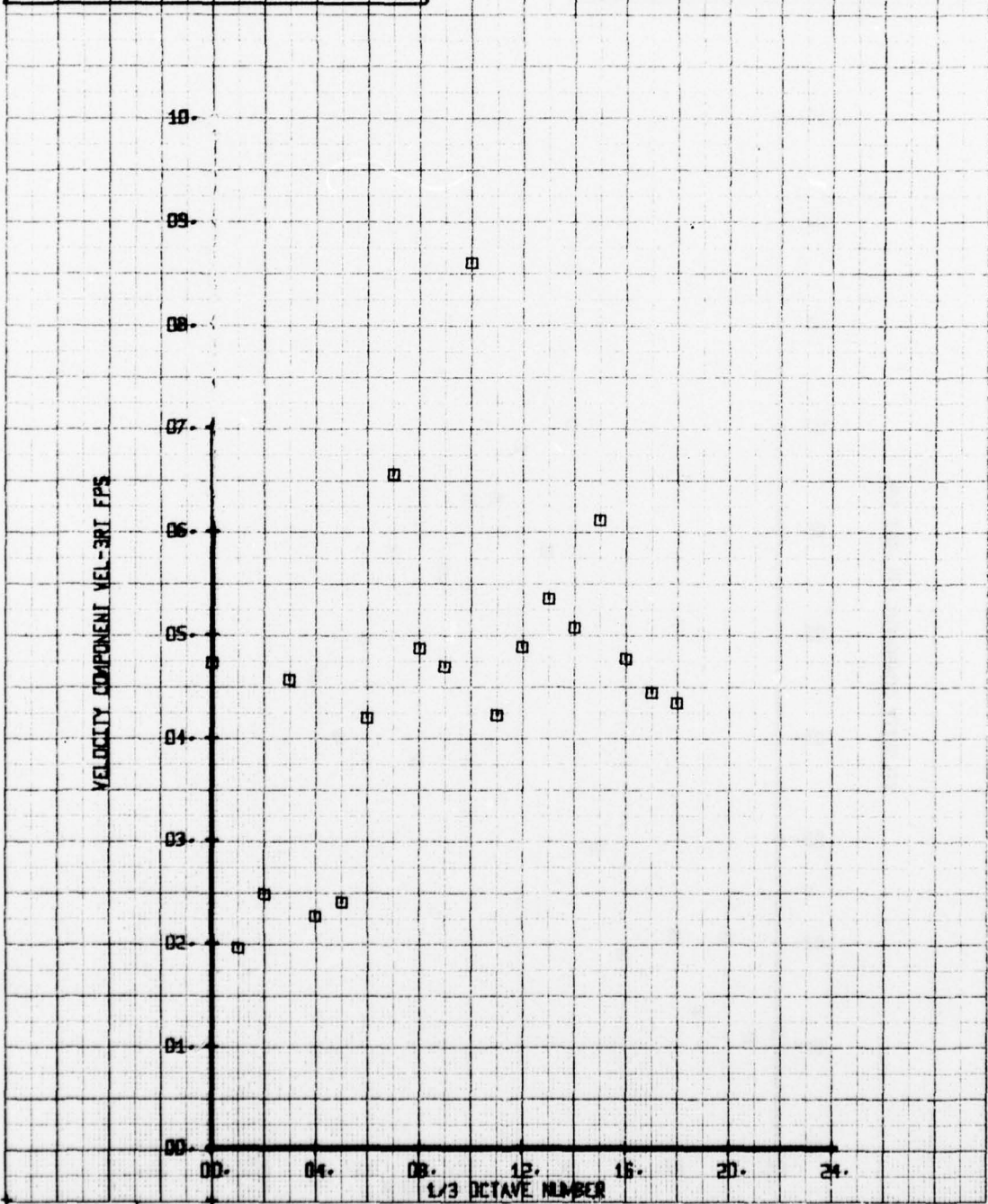


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 3

SYM
 □

CH
 71

LEGEND
 PARAMETER
 VEL-3RT

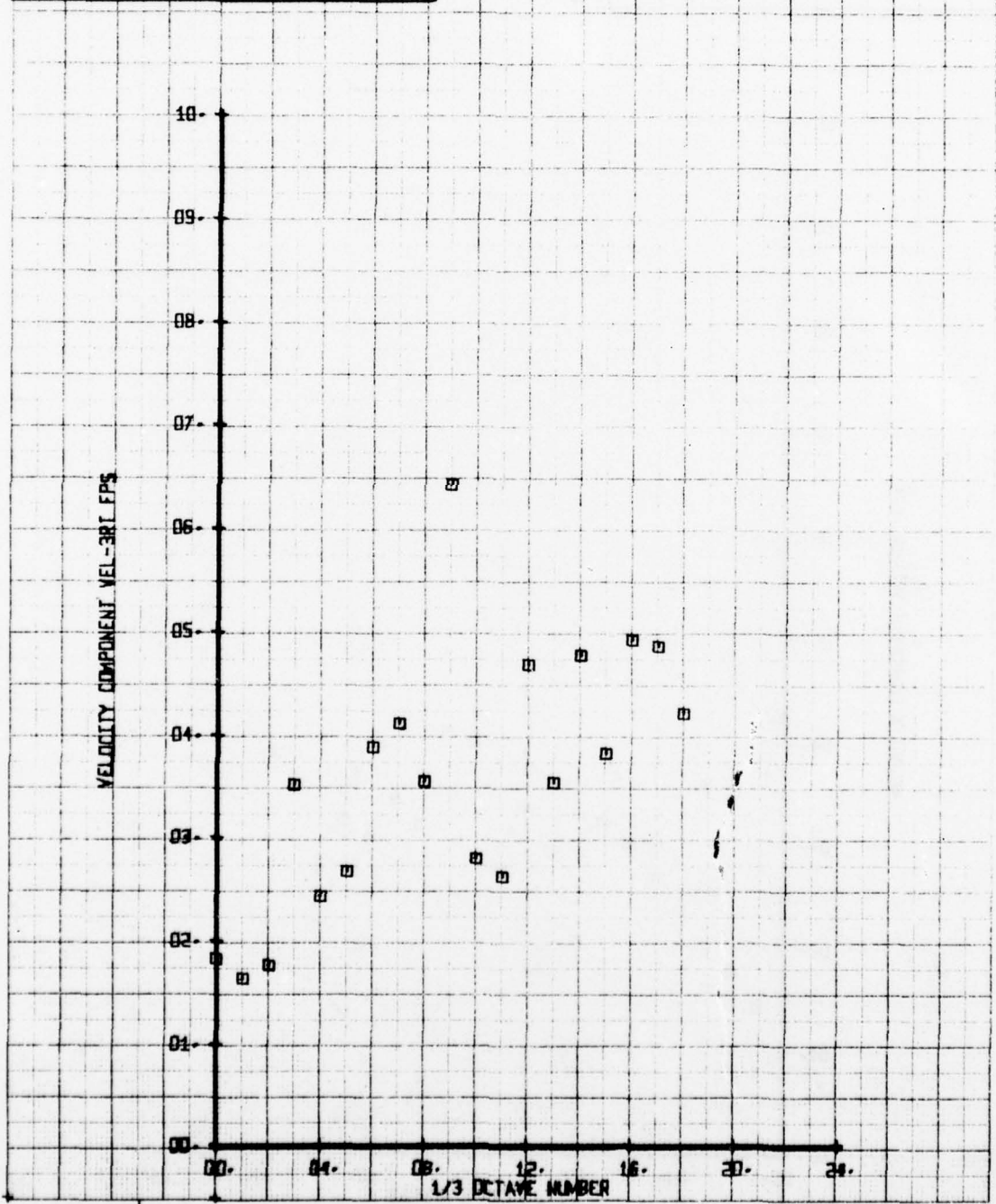


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 4

SYM
 0

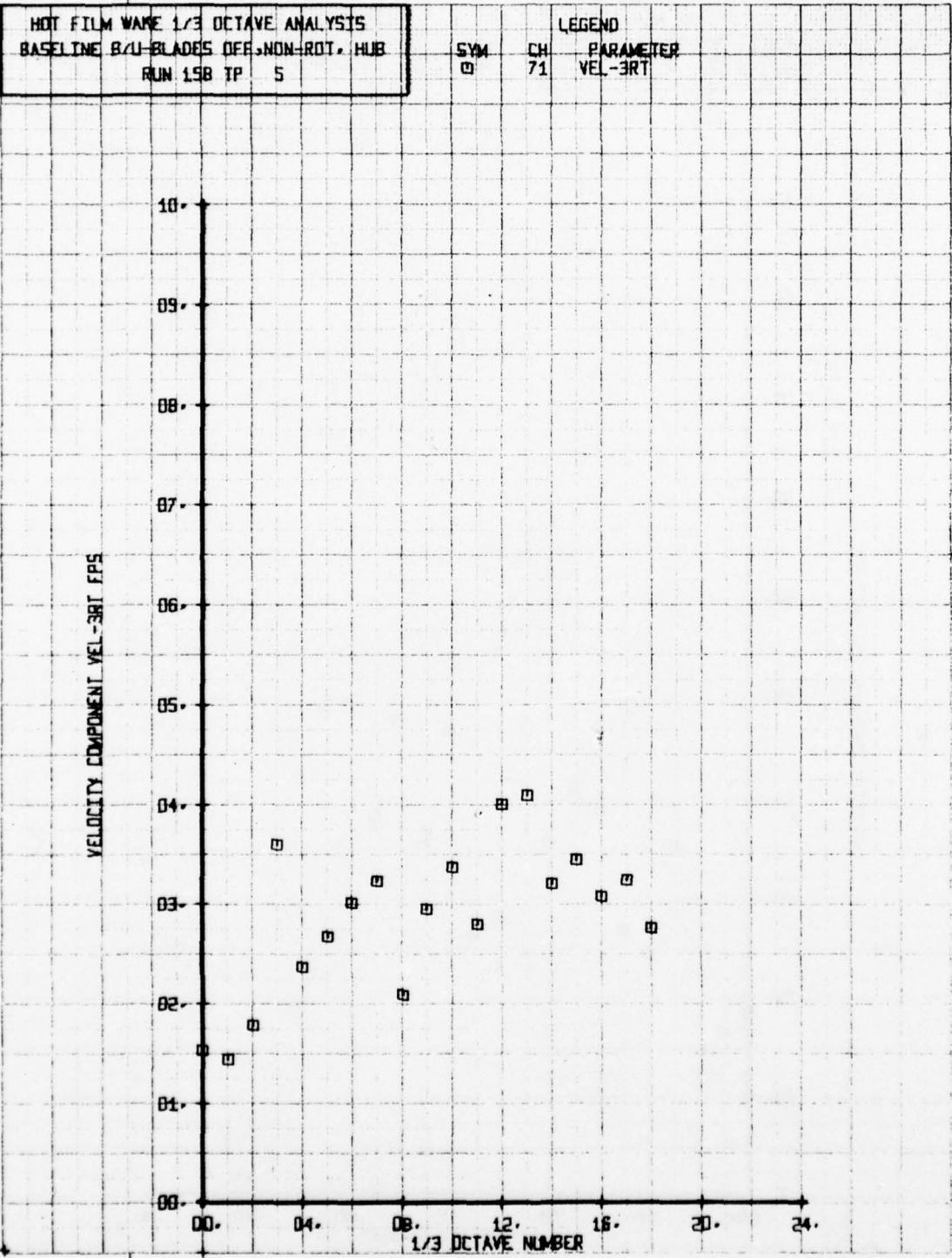
CH
 71

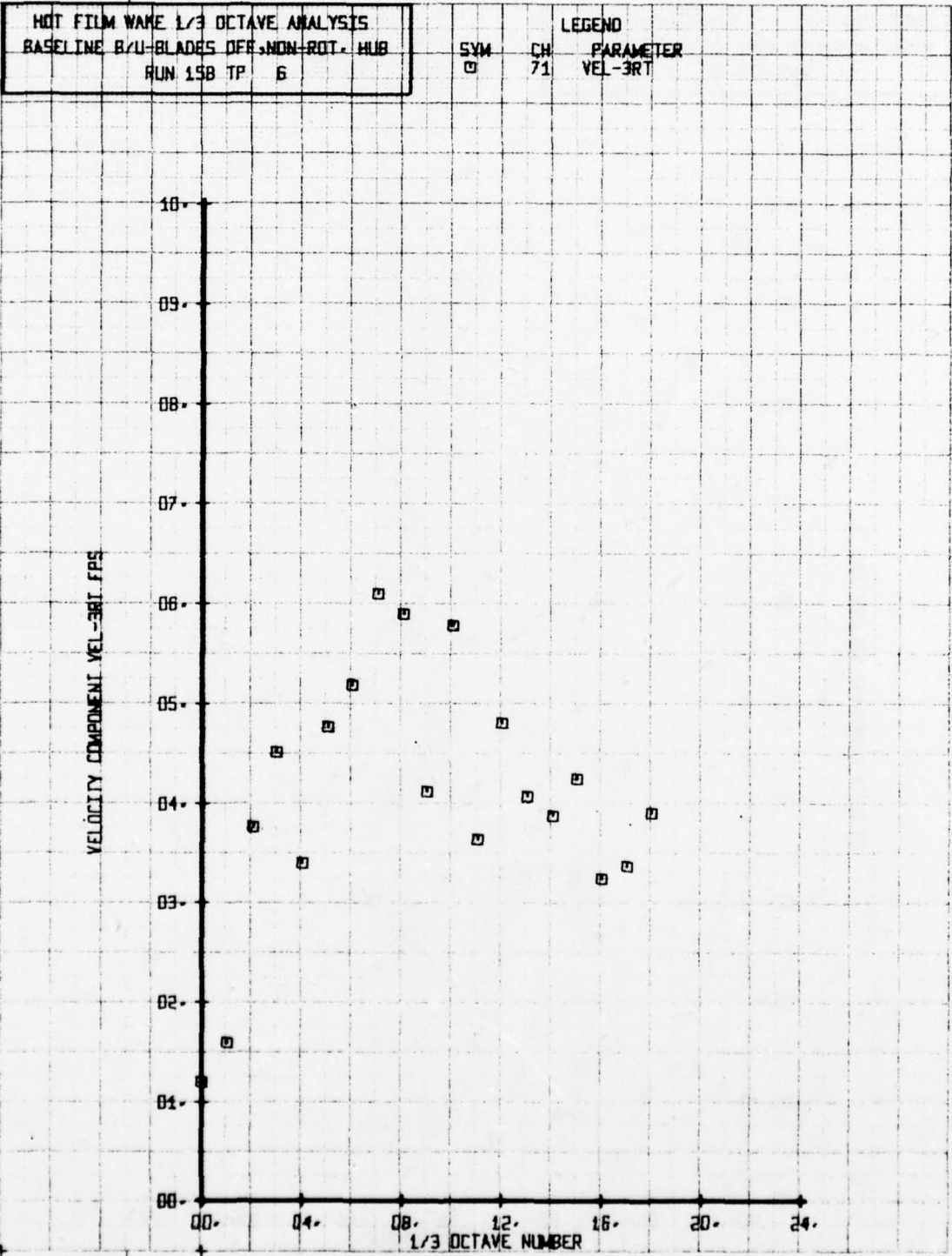
LEGEND
 PARAMETER
 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 198 TP 5

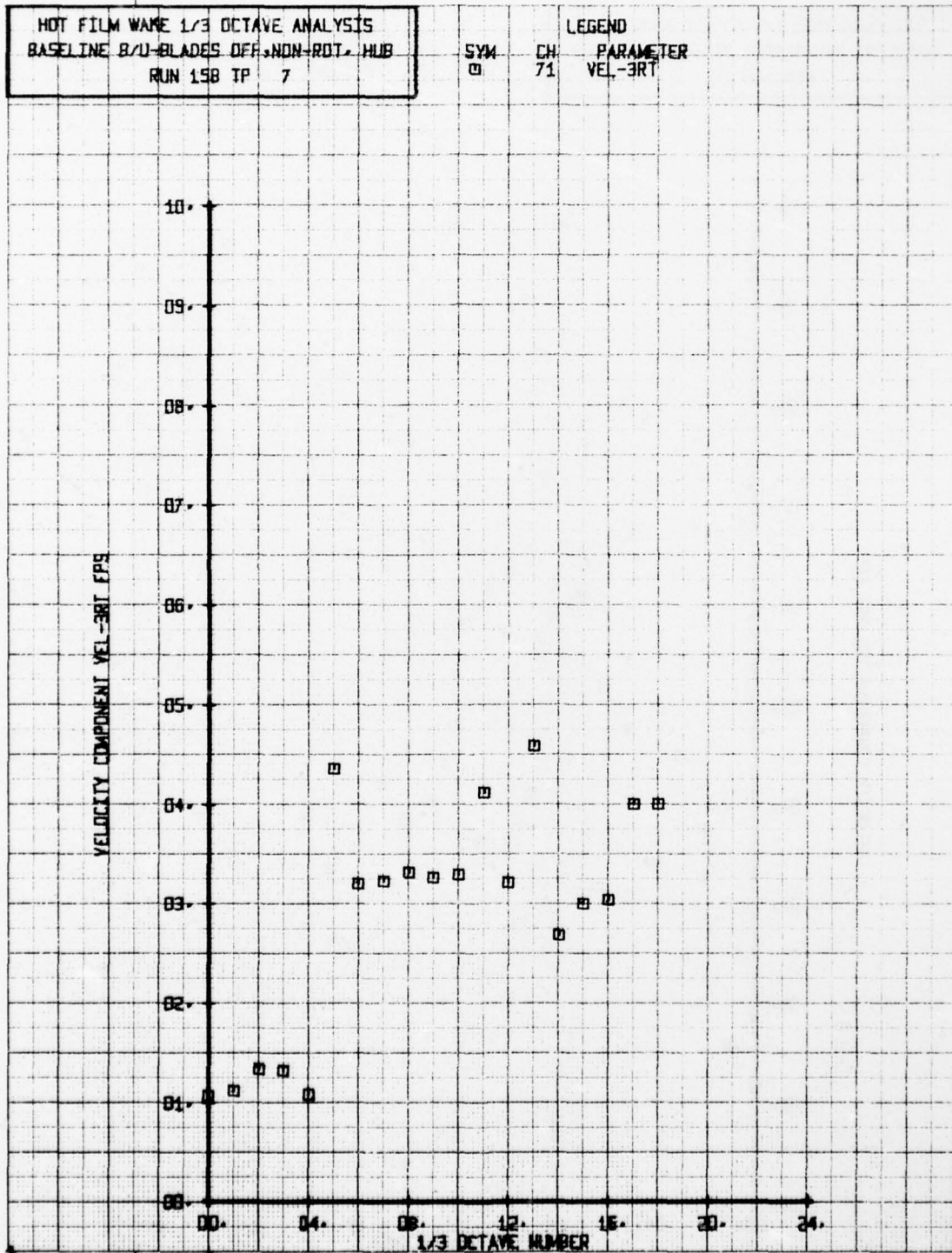
SYM	CH	PARAMETER
□	71	VEL-3RT





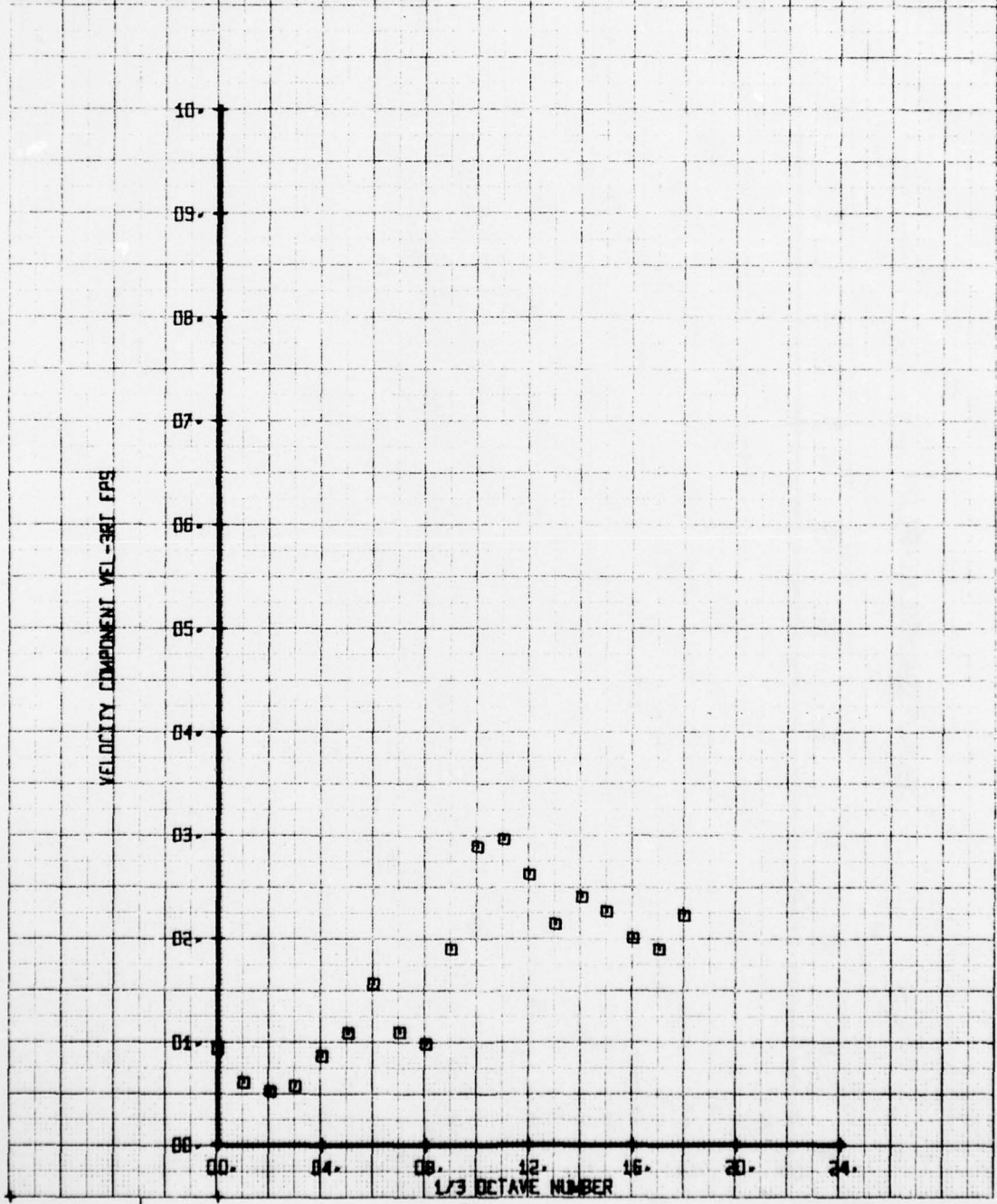
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, NON-ROT, HUB
RUN 158 TP 7

SYM CH PARAMETER
□ 71 VEL-3RT



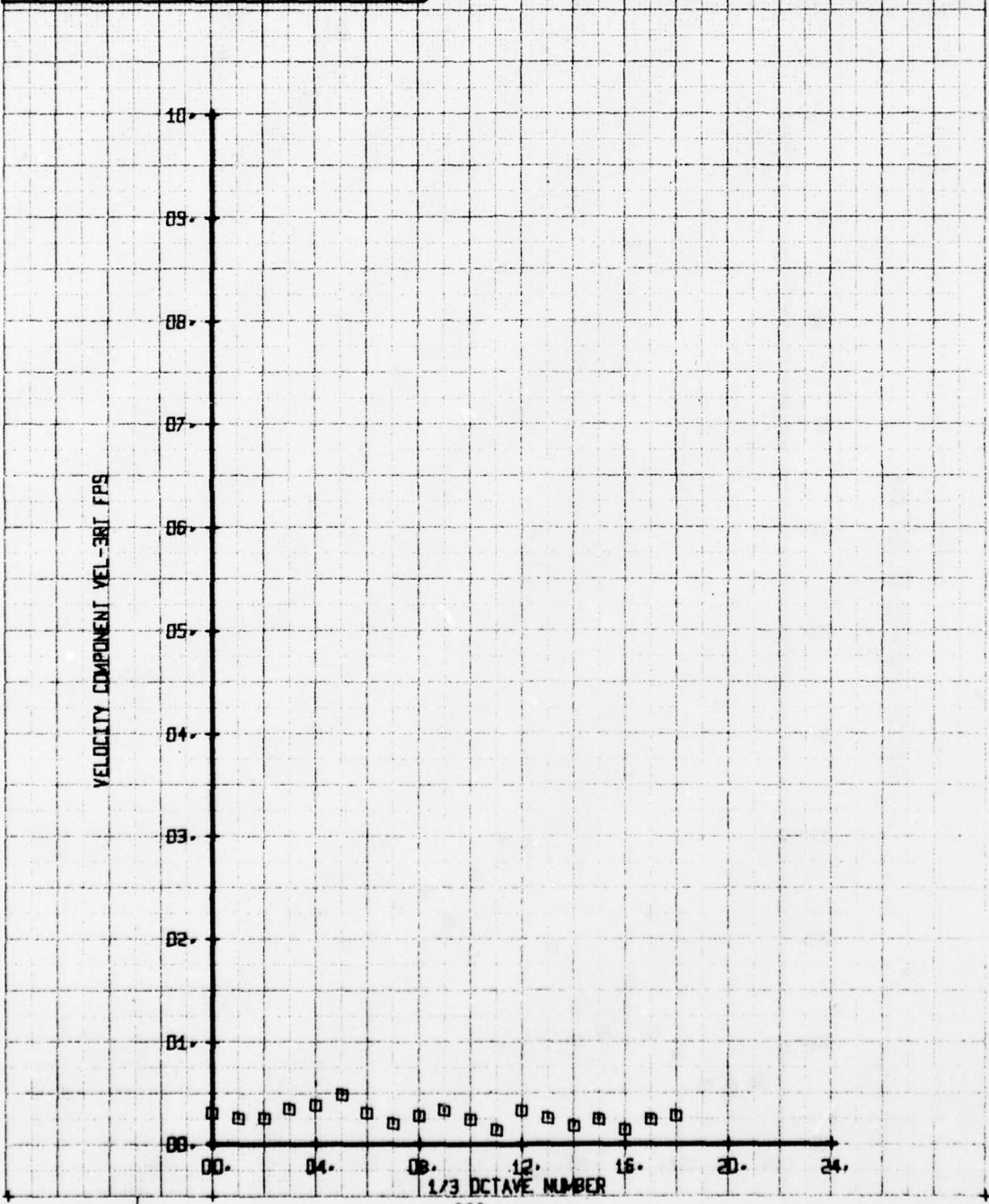
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF-NON-ROT-HUB
 RUN 158 TP B

LEGEND
 SYM CH PARAMETER
 □ 71 VEL-3RT



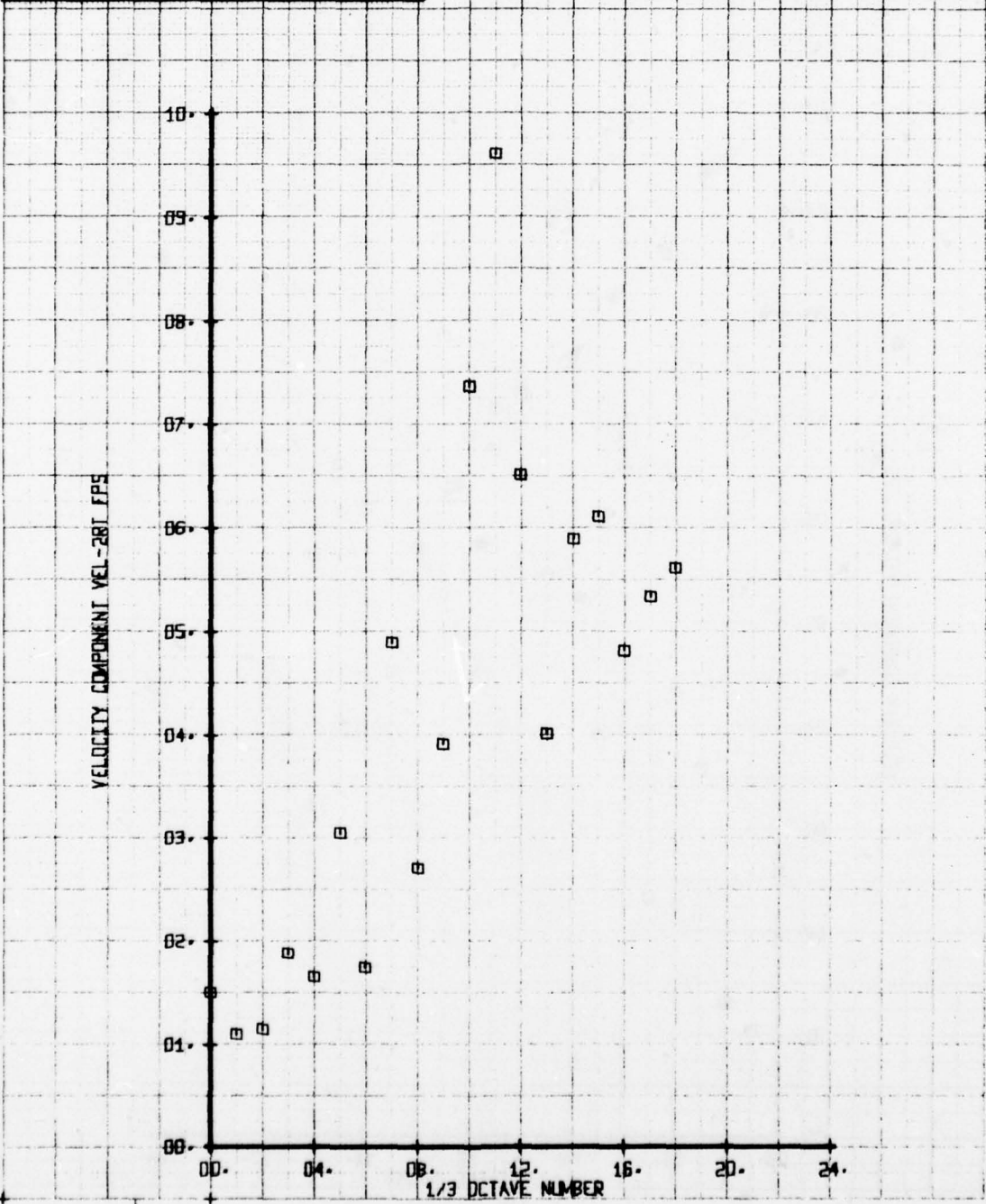
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF-NON-ROT. HUB
 RUN 158 TP B

SYM	CH	PARAMETER
□	71	VEL-3RT



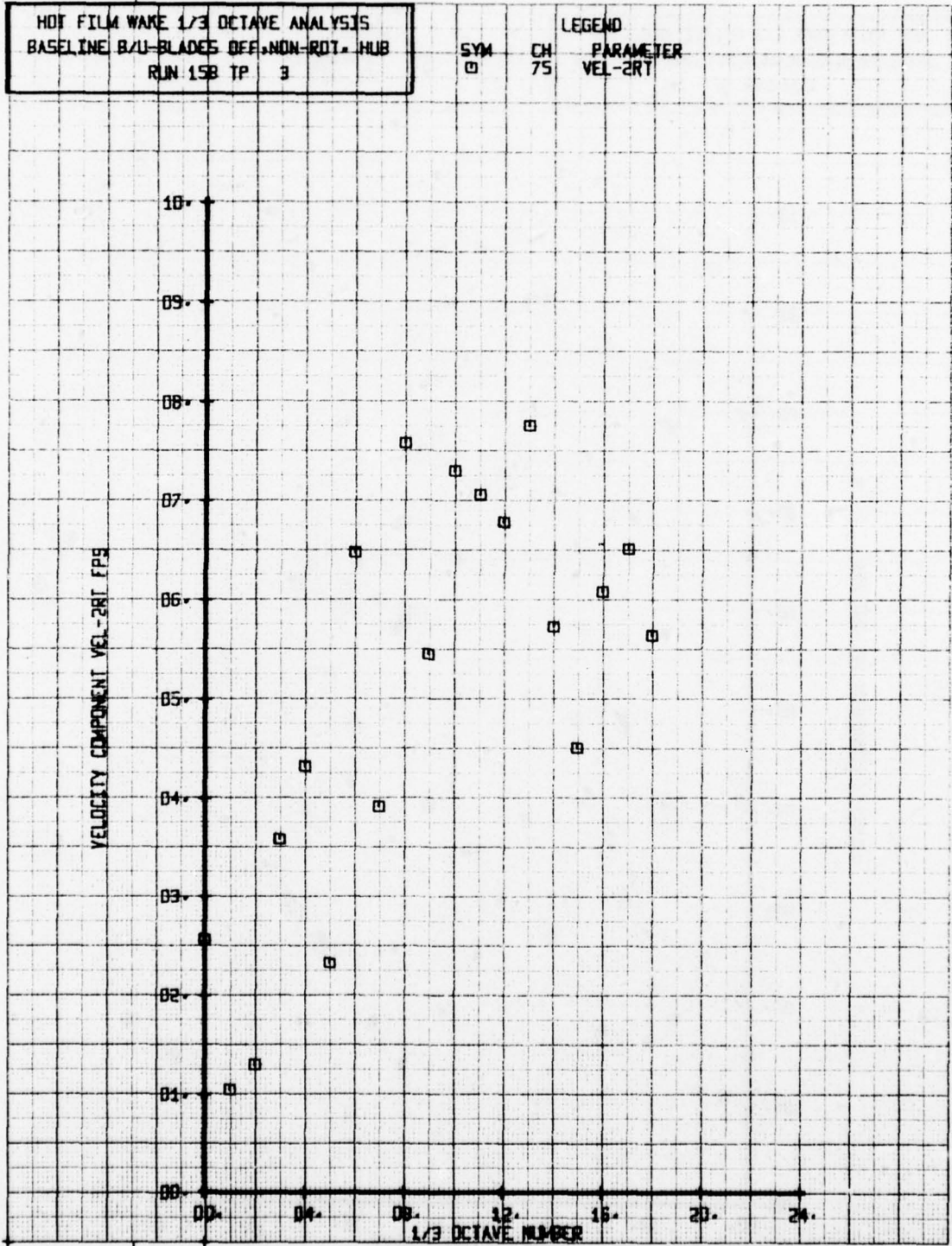
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 2

LEGEND
 SYM CH PARAMETER
 □ 75 VEL-2RT



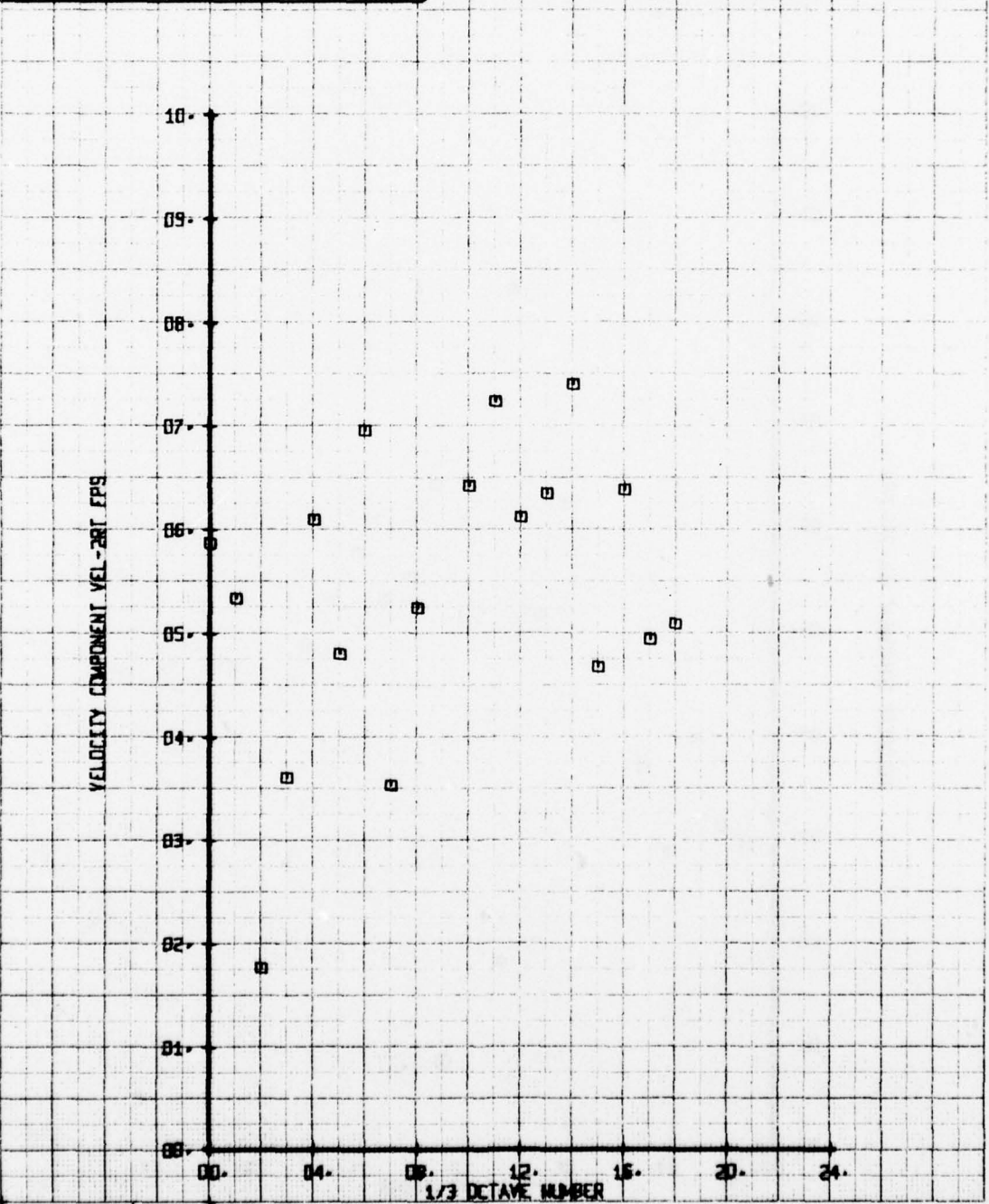
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, NON-RDT, HUB
RUN 15B TP 3

SYN CH LEGEND
□ 75 PARAMETER
VEL-2RT



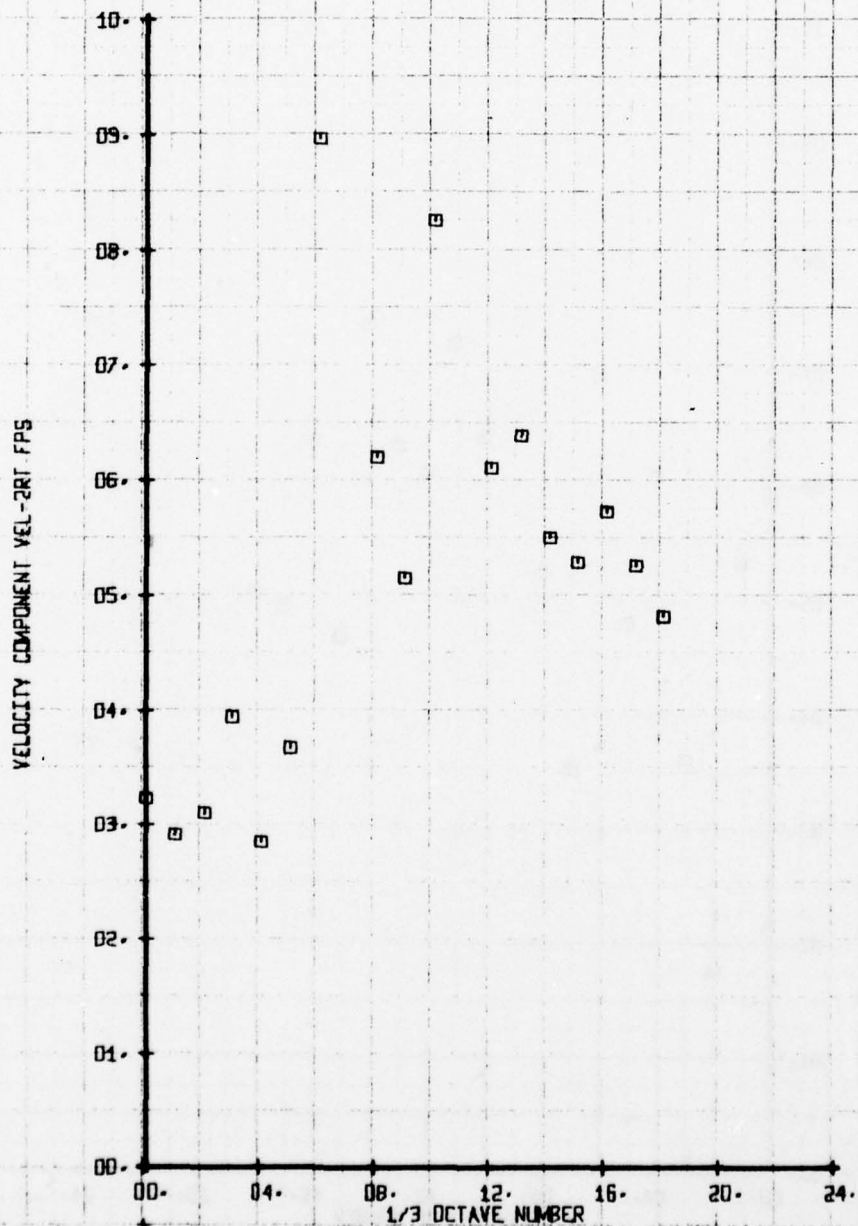
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 4

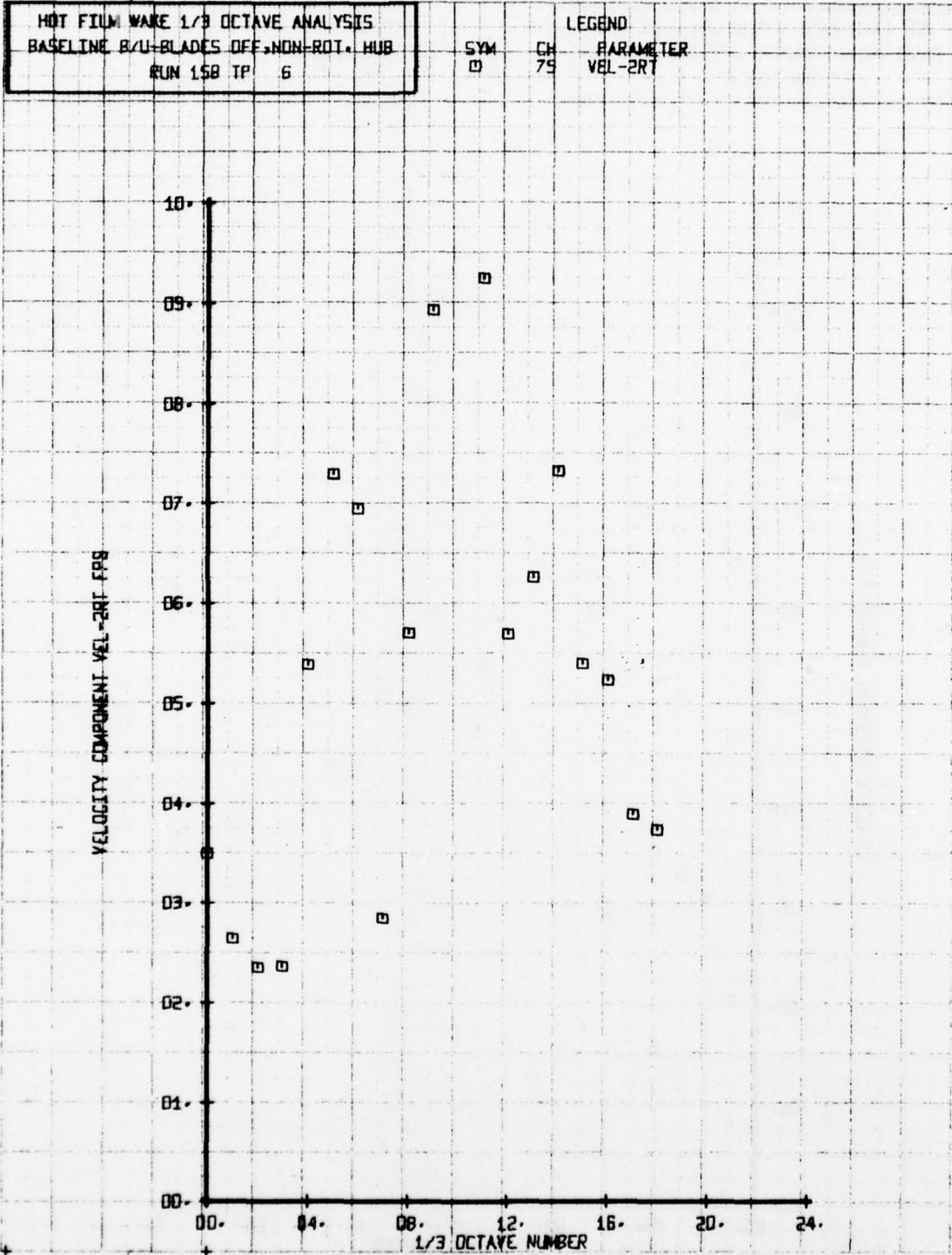
SYM CH PARAMETER
 □ 75 VEL-2RT



HOT FIUM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROI, HUB
 RUN 158 TP 5

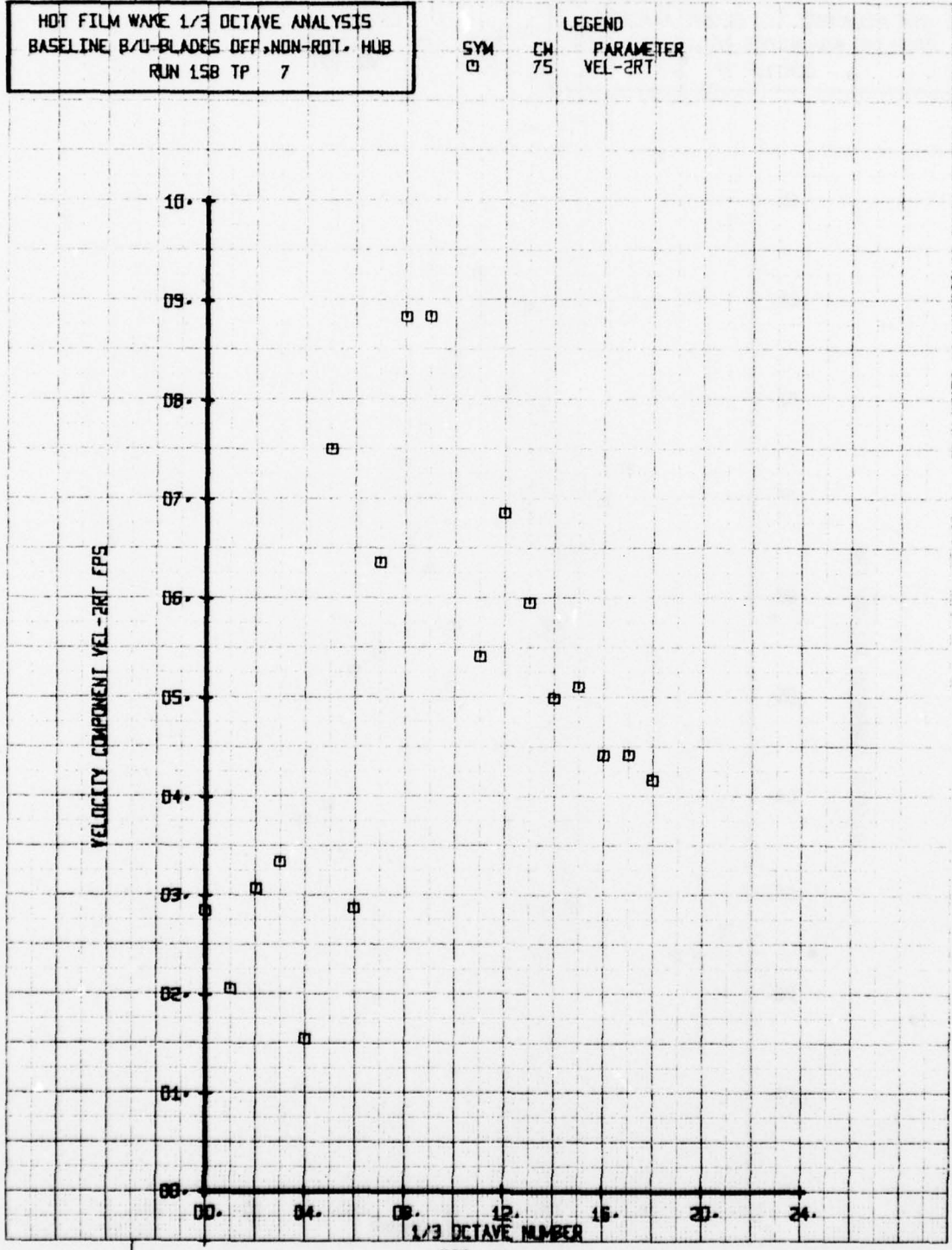
LEGEND
 SYM CH PARAMETER
 □ 75 VEL-2RT





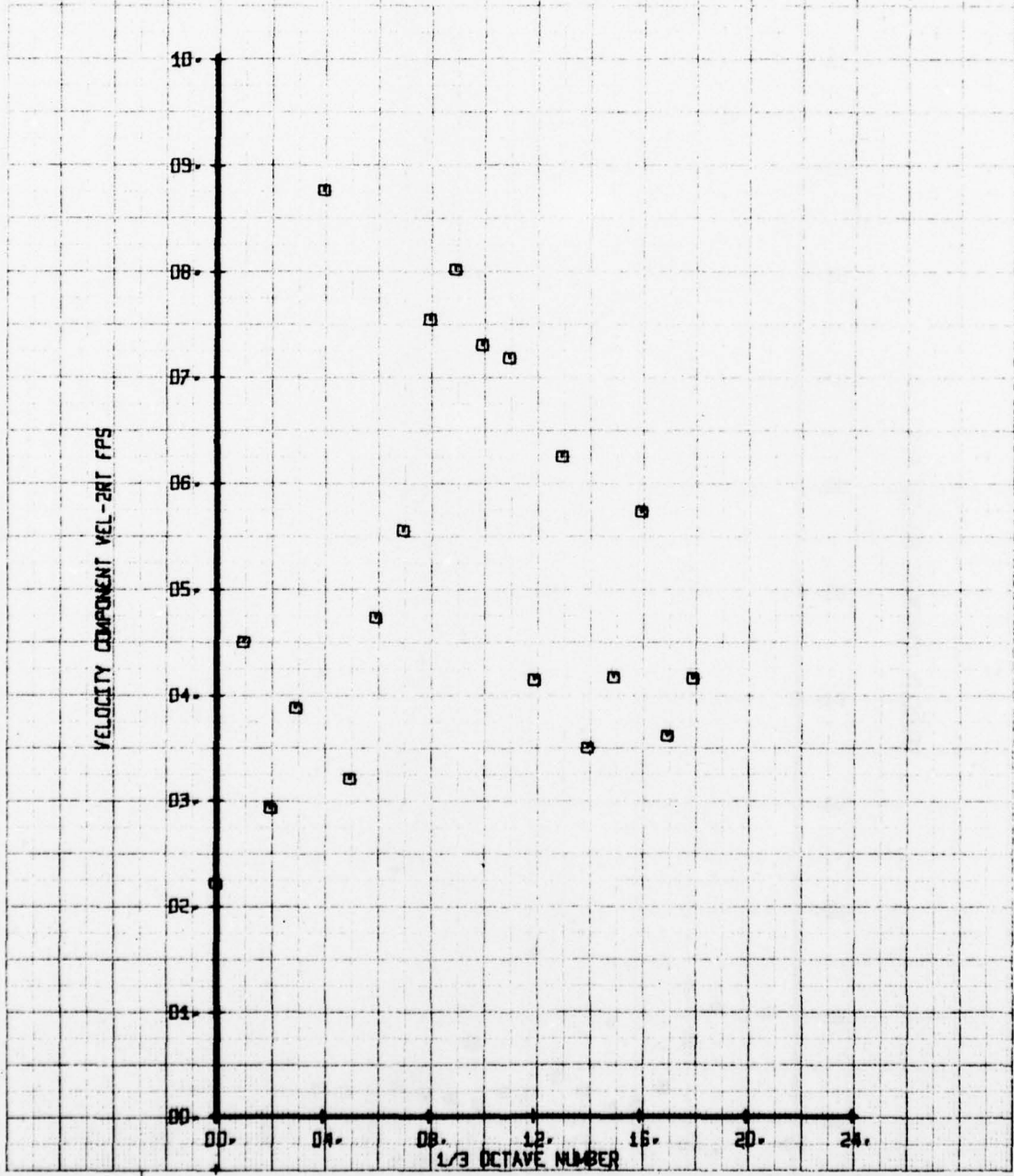
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 7

SYM CM PARAMETER
 □ 75 VEL-2RT



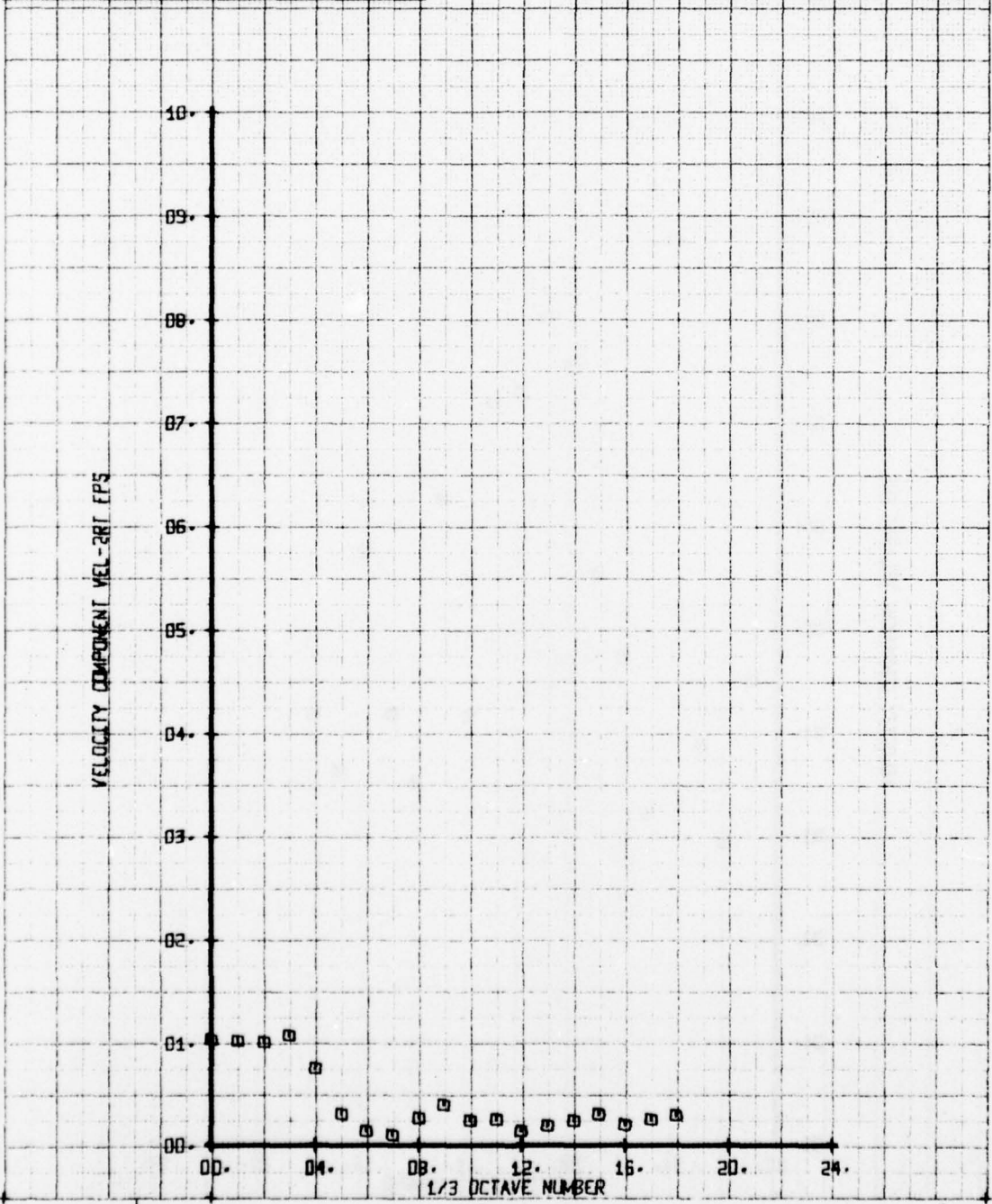
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF-NON-ROT-HUB
 RUN 15B TP B

LEGEND
 SYM CH PARAMETER
 □ 75 VEL-2RT



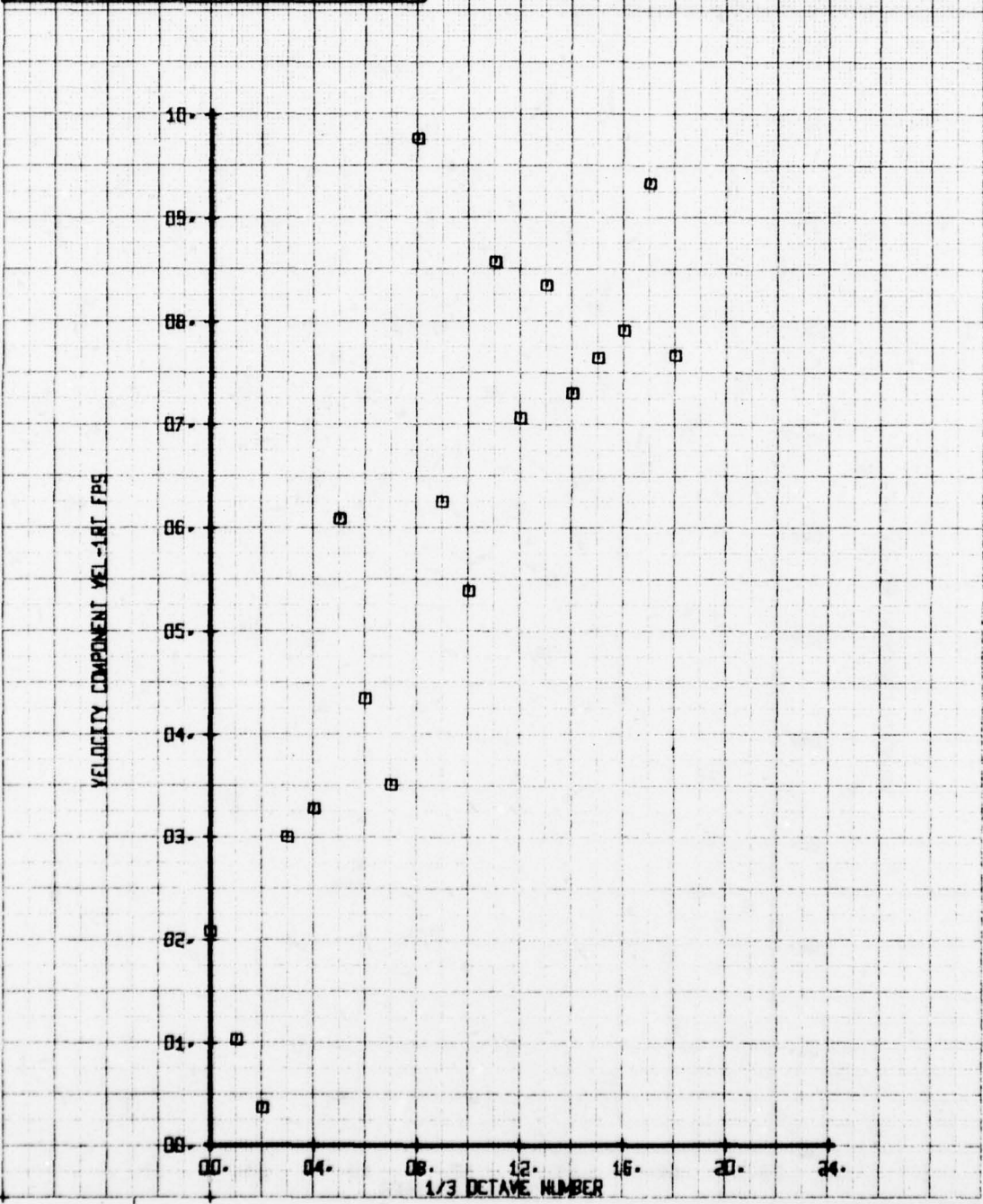
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES DEF, NON-ROT, HUB
 RUN 158 TP 9

SYN CH PARAMETER
 □ 75 VEL-2RT



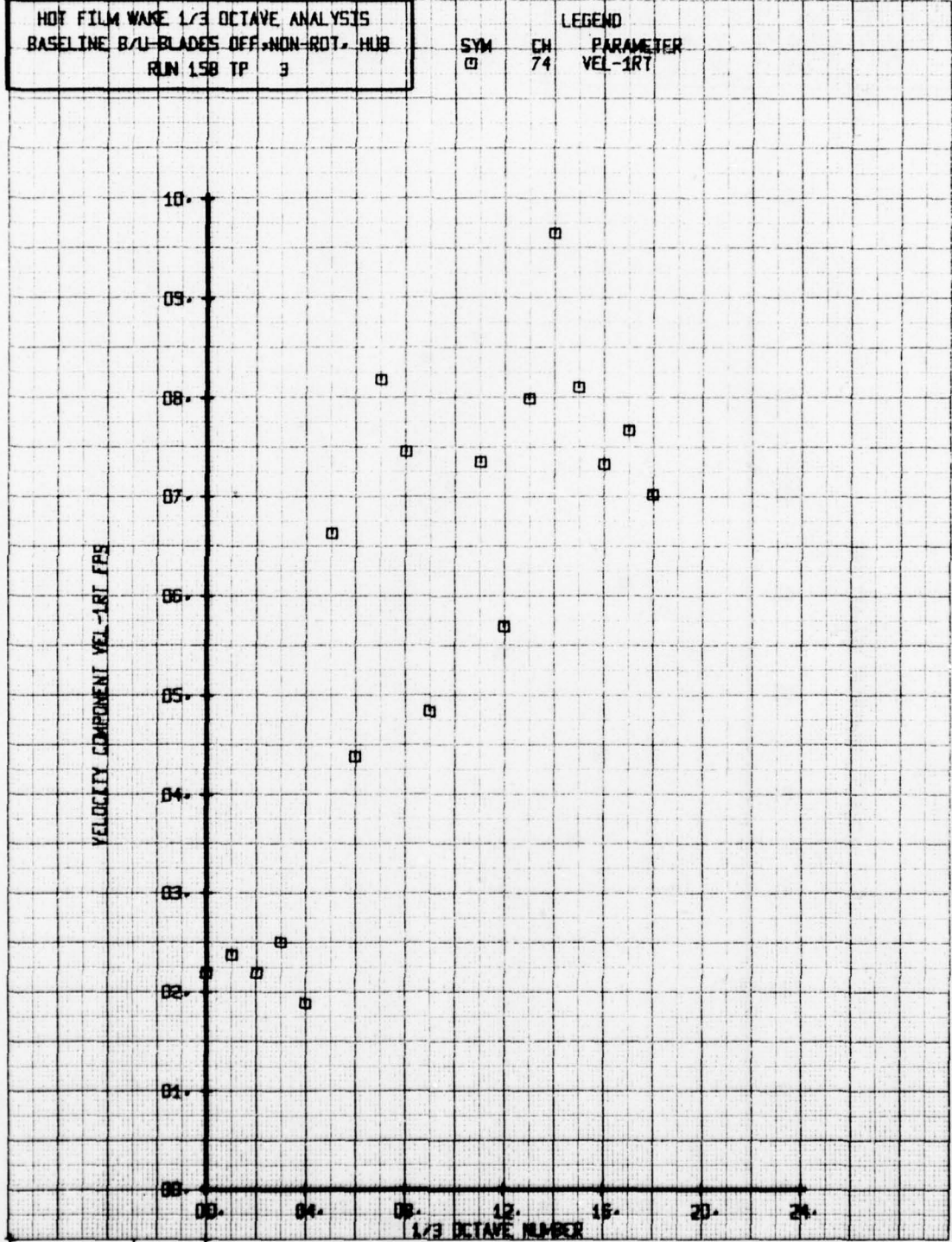
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 2

LEGEND
 SYM CH PARAMETER
 □ 74 VEL-1RT



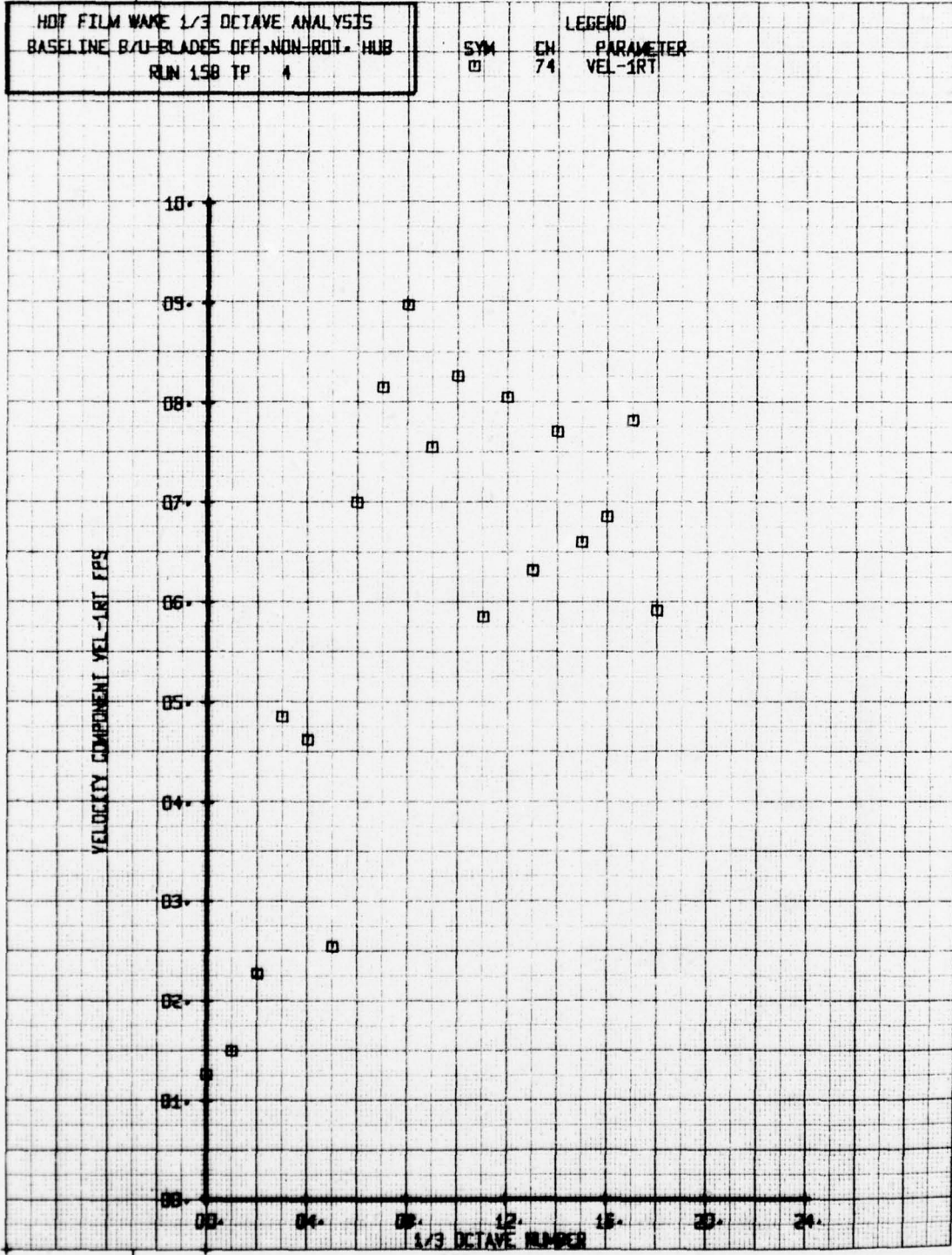
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT, HUB
 RUN 158 TP 3

LEGEND
 SYM CH PARAMETER
 □ 74 VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 4

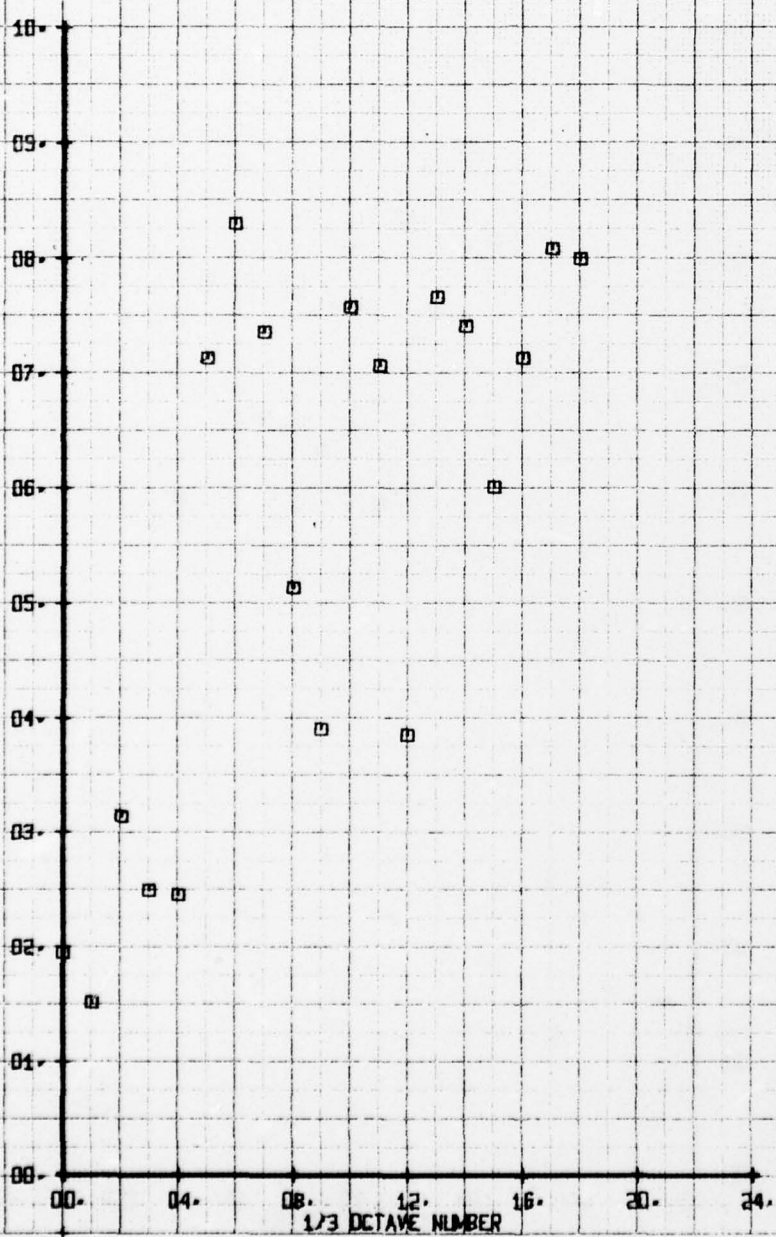
SYM CH PARAMETER
 □ 74 VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 5

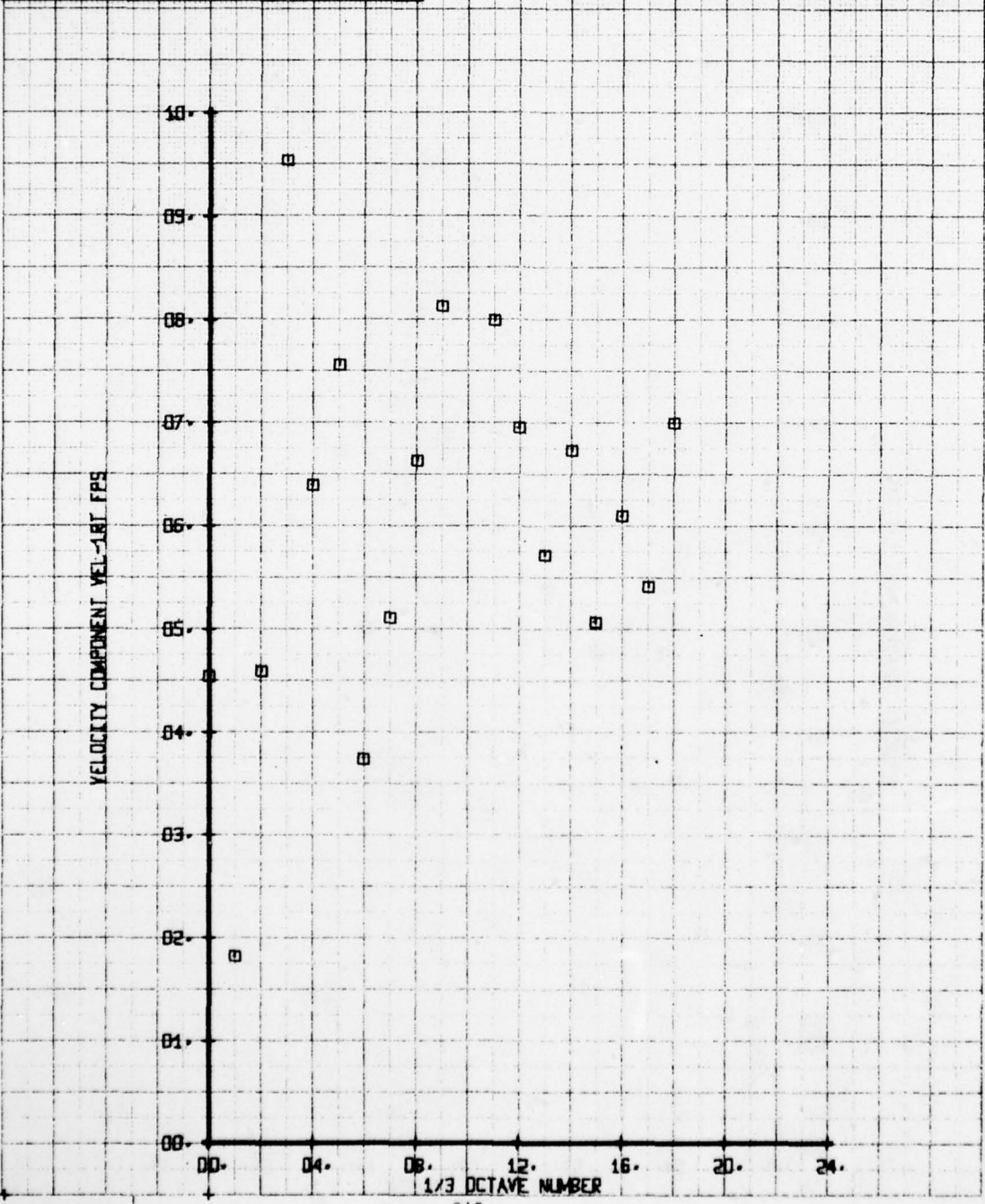
LEGEND
 SYM CH PARAMETER
 □ 74 VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



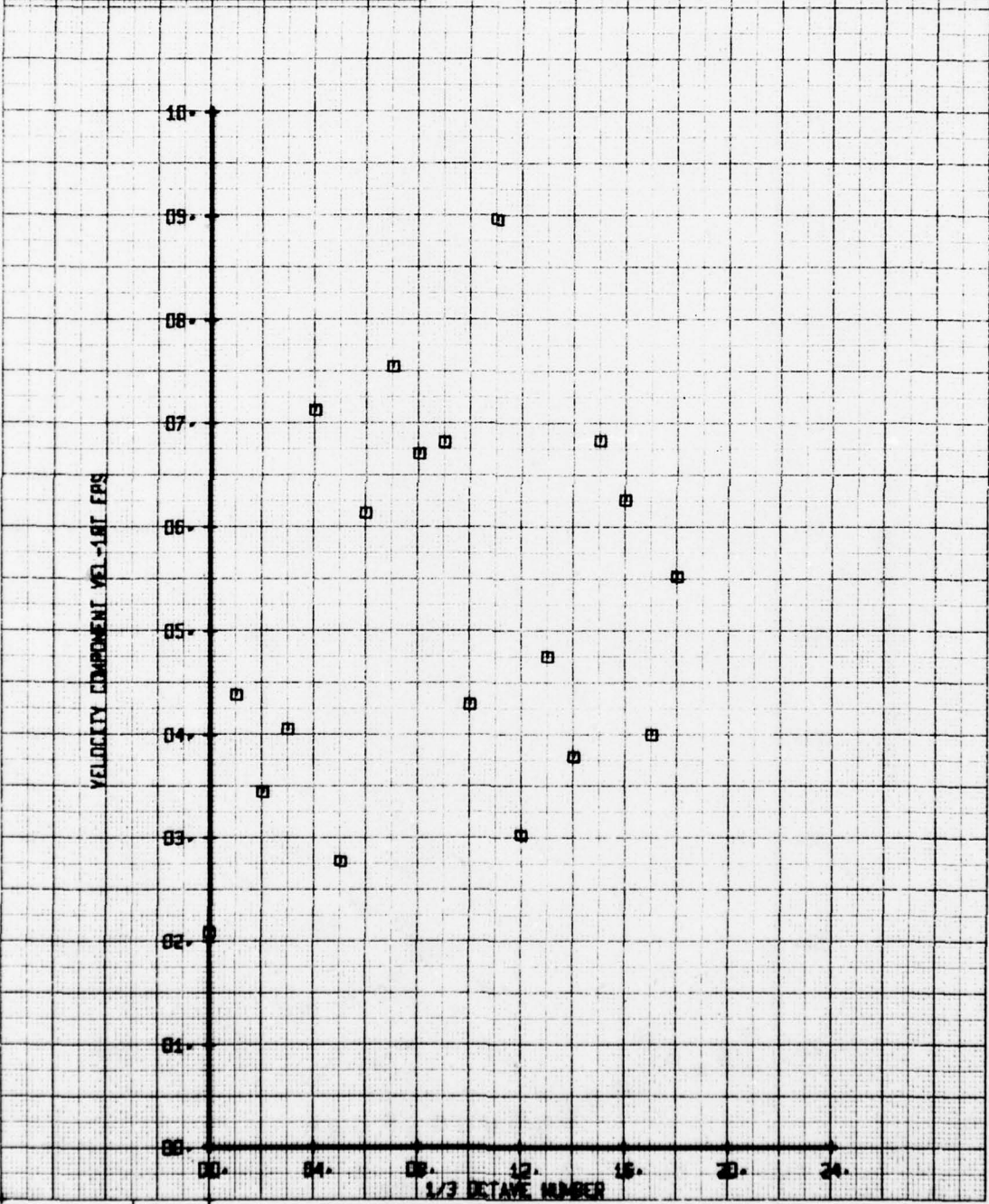
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF-NON-ROT. HUB
 RUN 158 TP 6

SYM CH PARAMETER
 □ 74 VEL-1RT



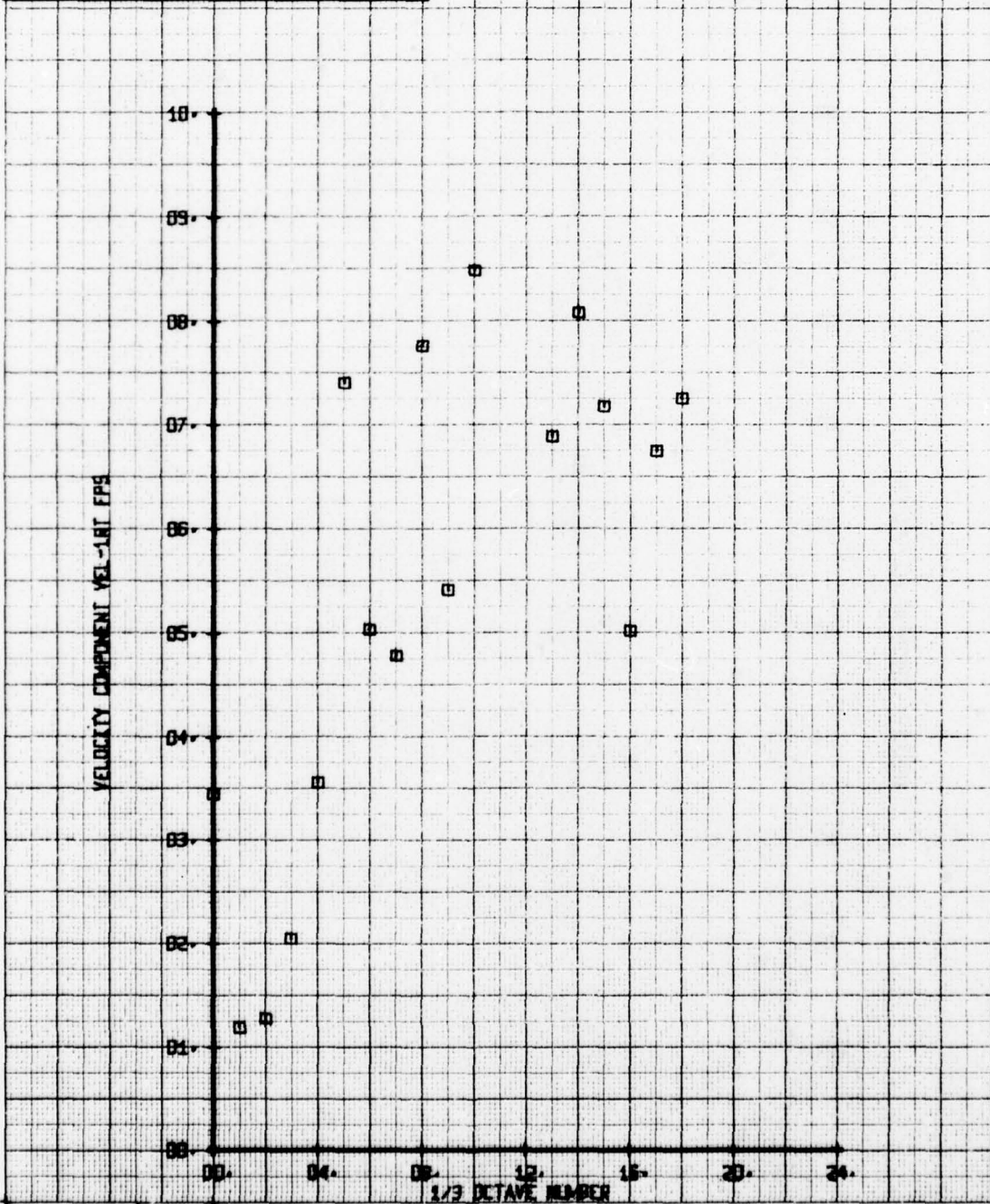
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, NON-ROT. HUB
RUN 158 TP B

SYN CH PARAMETER
□ 74 VEL-1RT



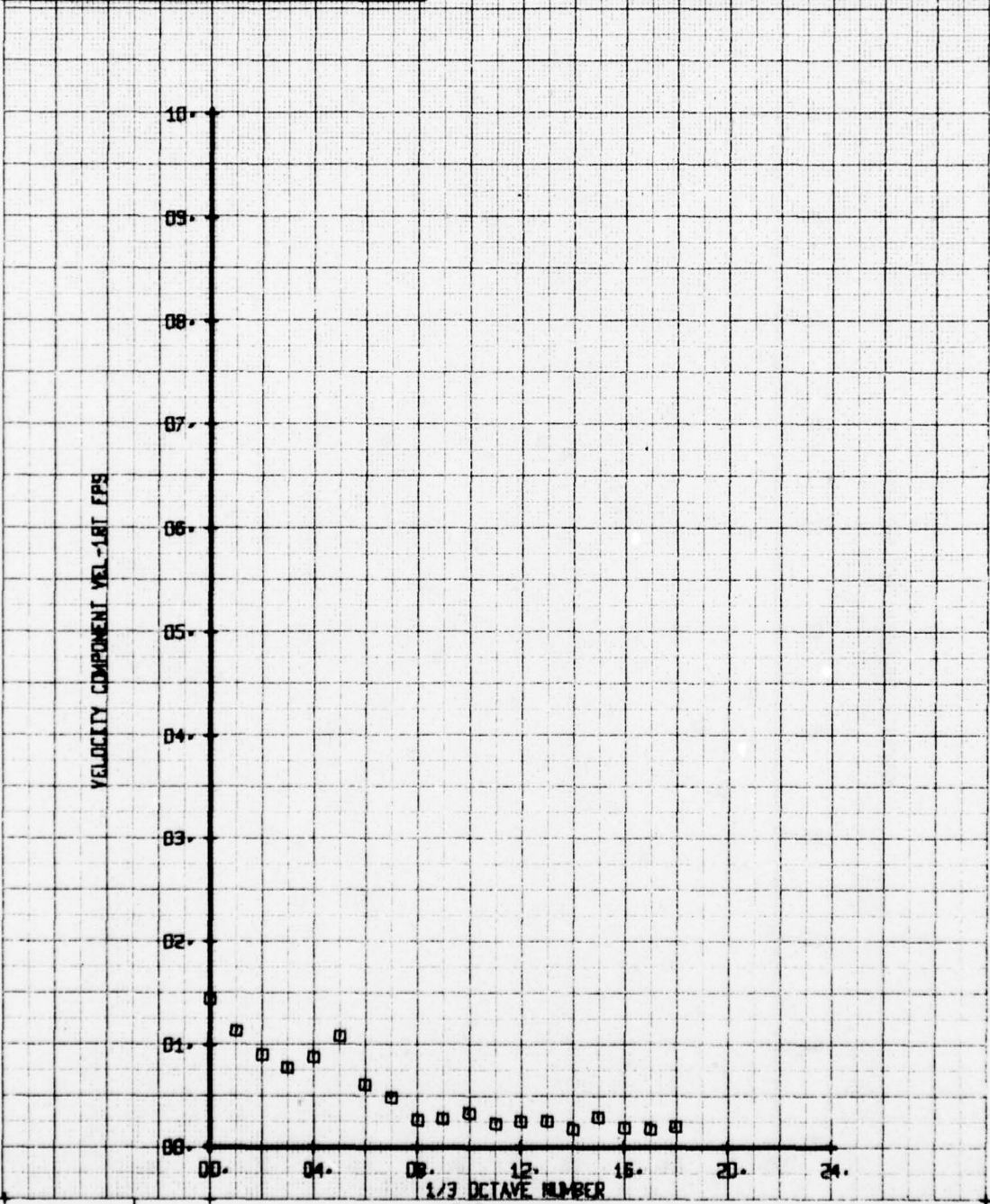
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT, HUB
 RUN 158 TP 7

LEGEND
 SYM CH PARAMETER
 □ 74 VEL-1RT



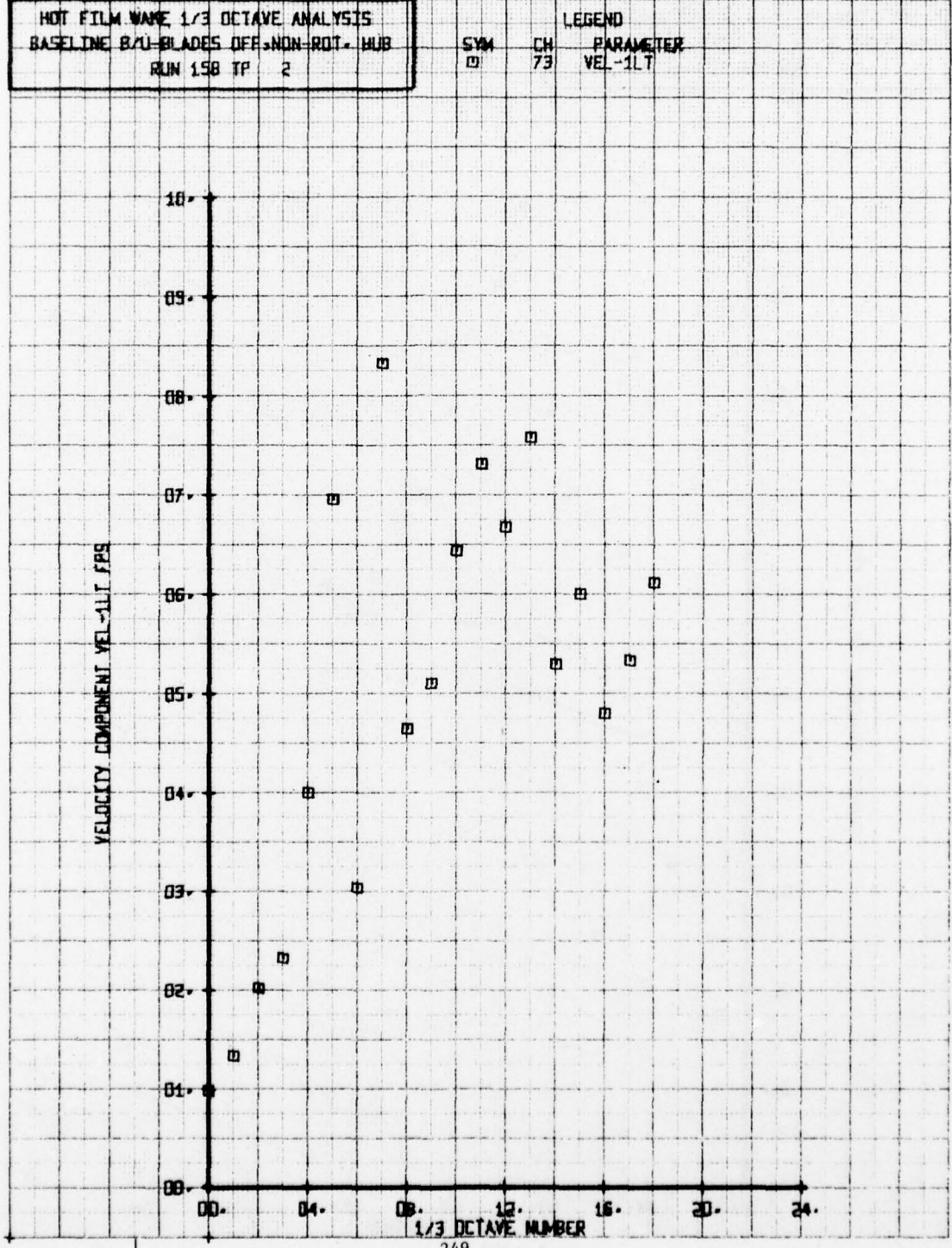
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11 BLADES OFF, NON-ROT. HUB
 RUN 158 TP 9

LEGEND		
SYM	CH	PARAMETER
□	74	VEL-1RT



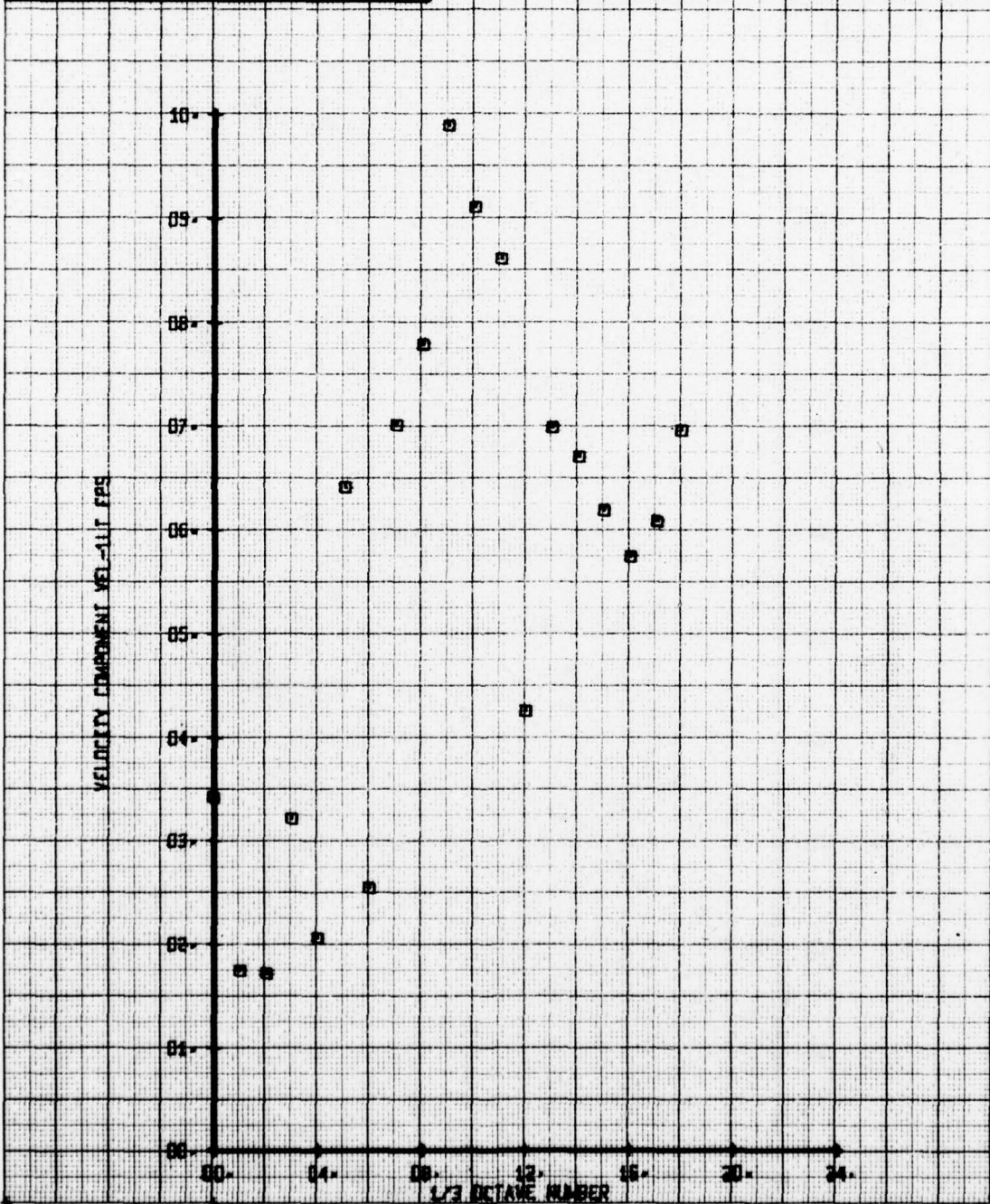
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF-NON-ROT-HUB
 RUN 158 TP 2

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



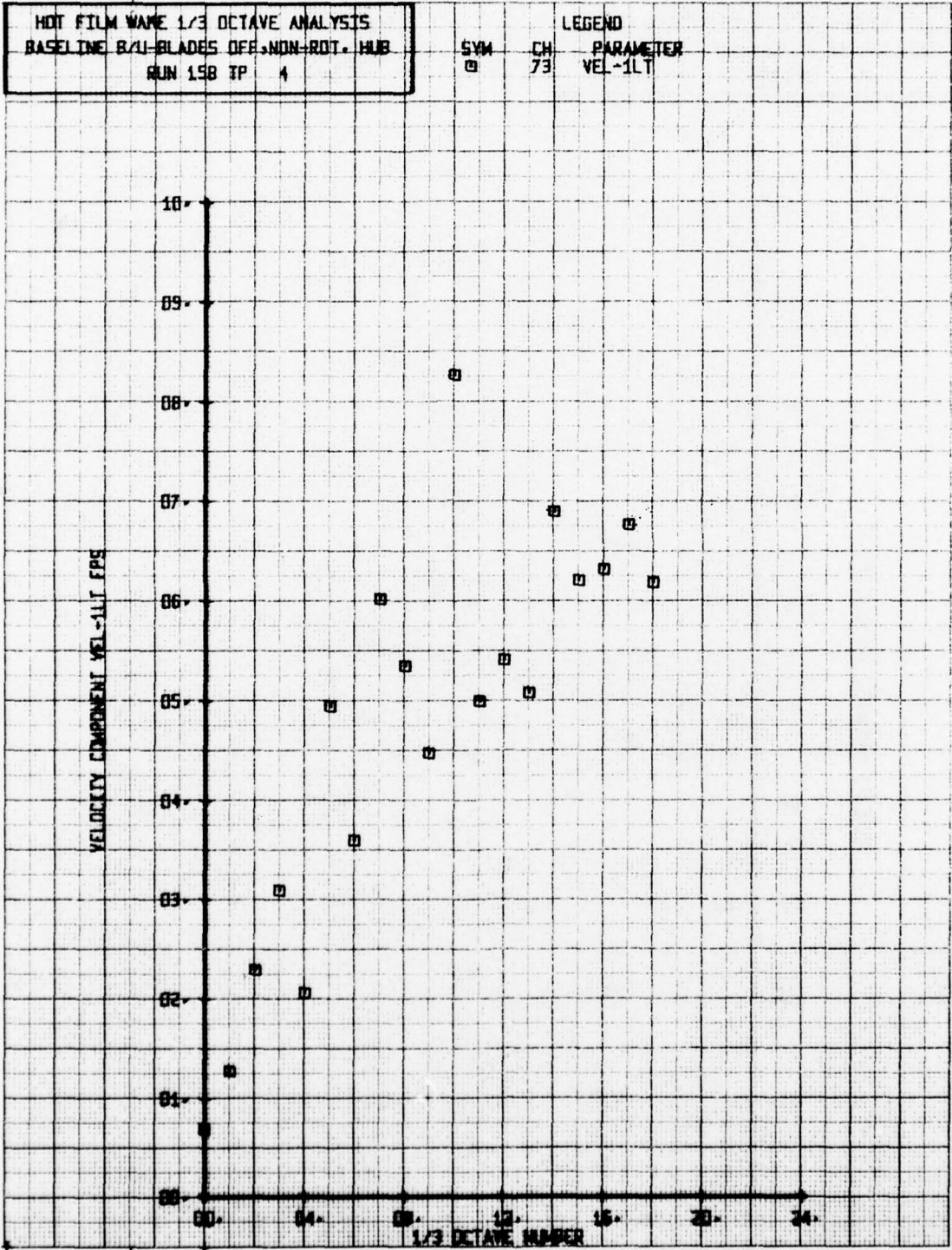
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 3

SYM CH PARAMETER
 □ 73 VEL-1LT



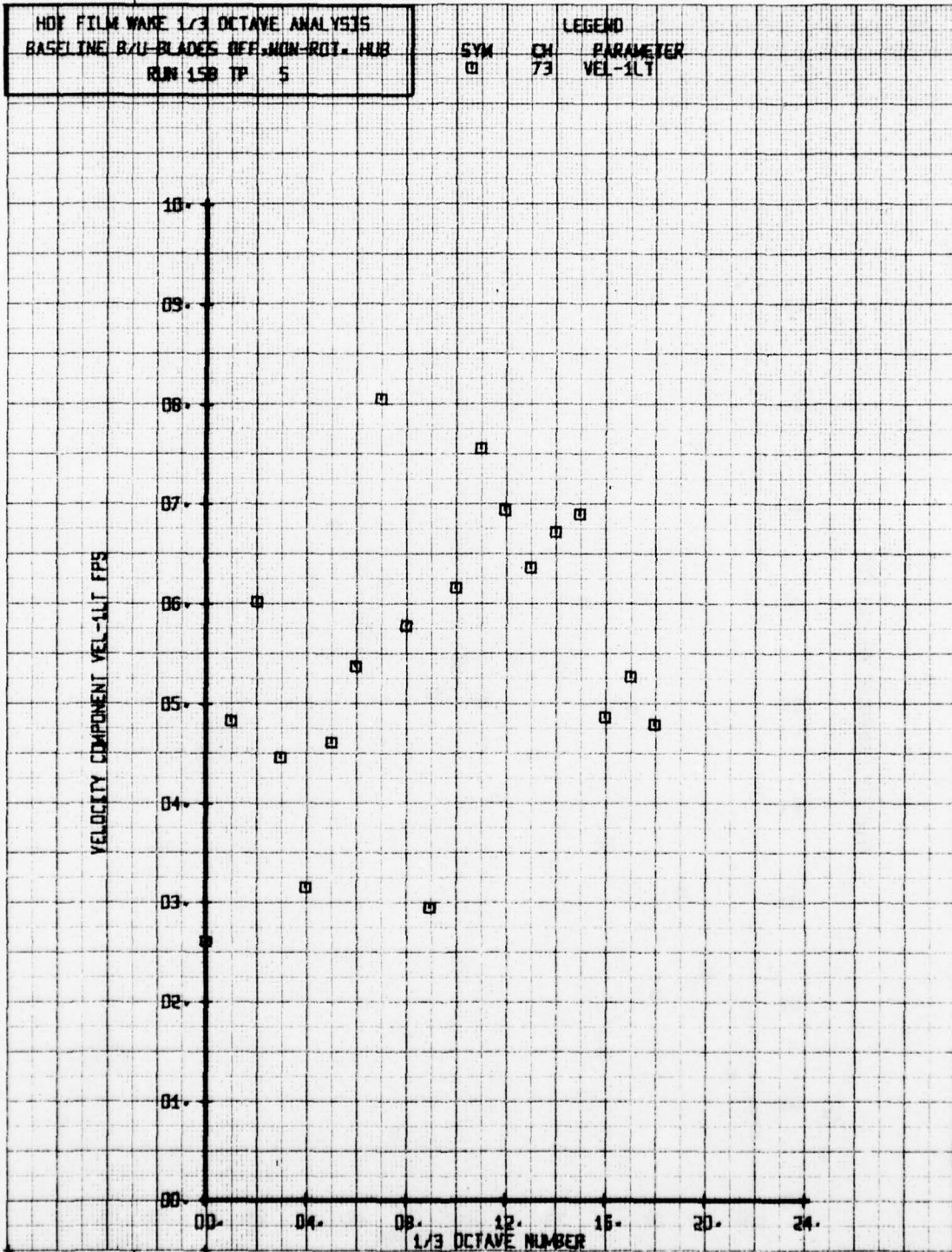
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 4

SYN CH PARAMETER
 0 73 VEL-1LT



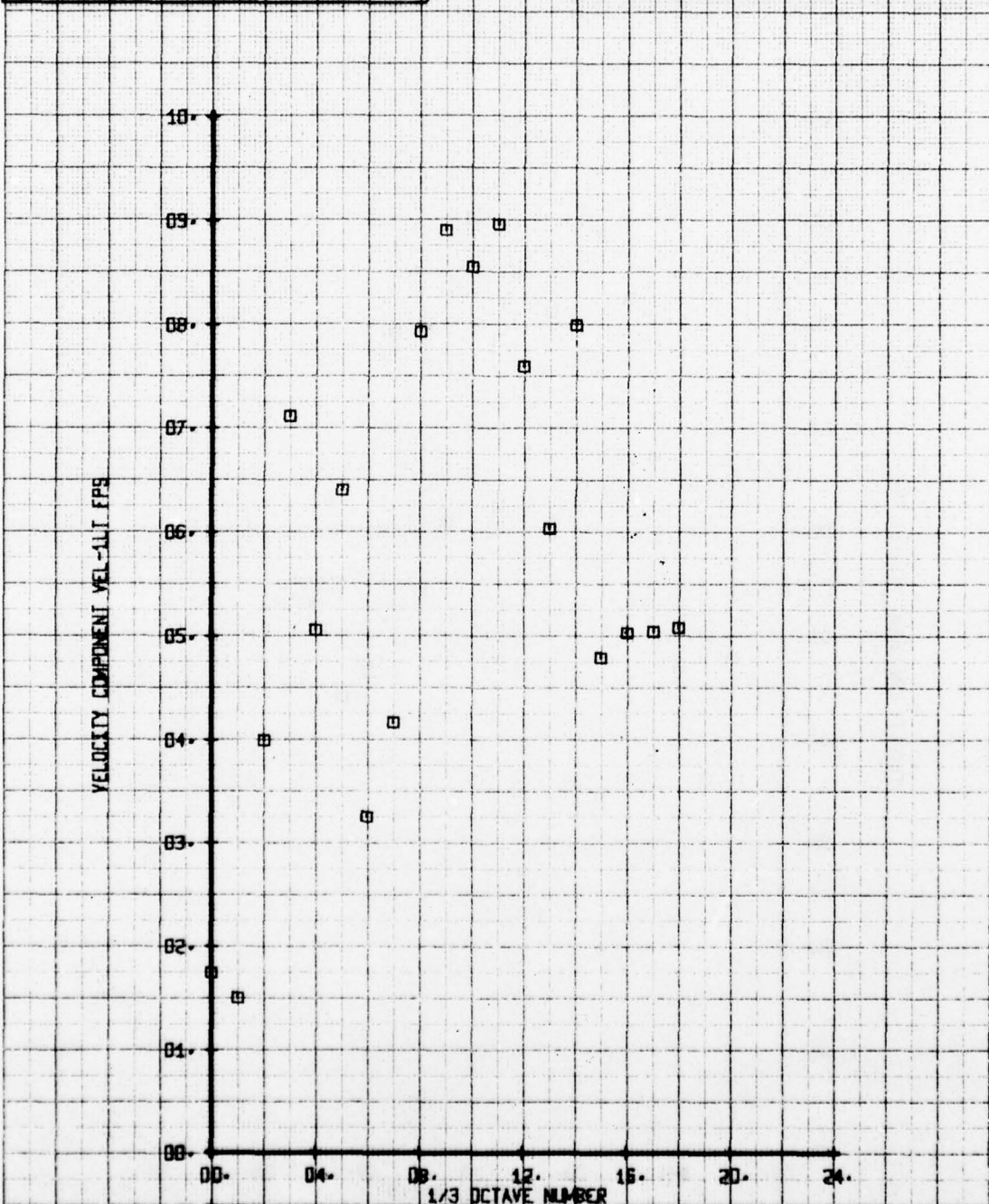
HOF FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U BLADES DEF. NON-ROT. HUB
 RUN 158 TP 5

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



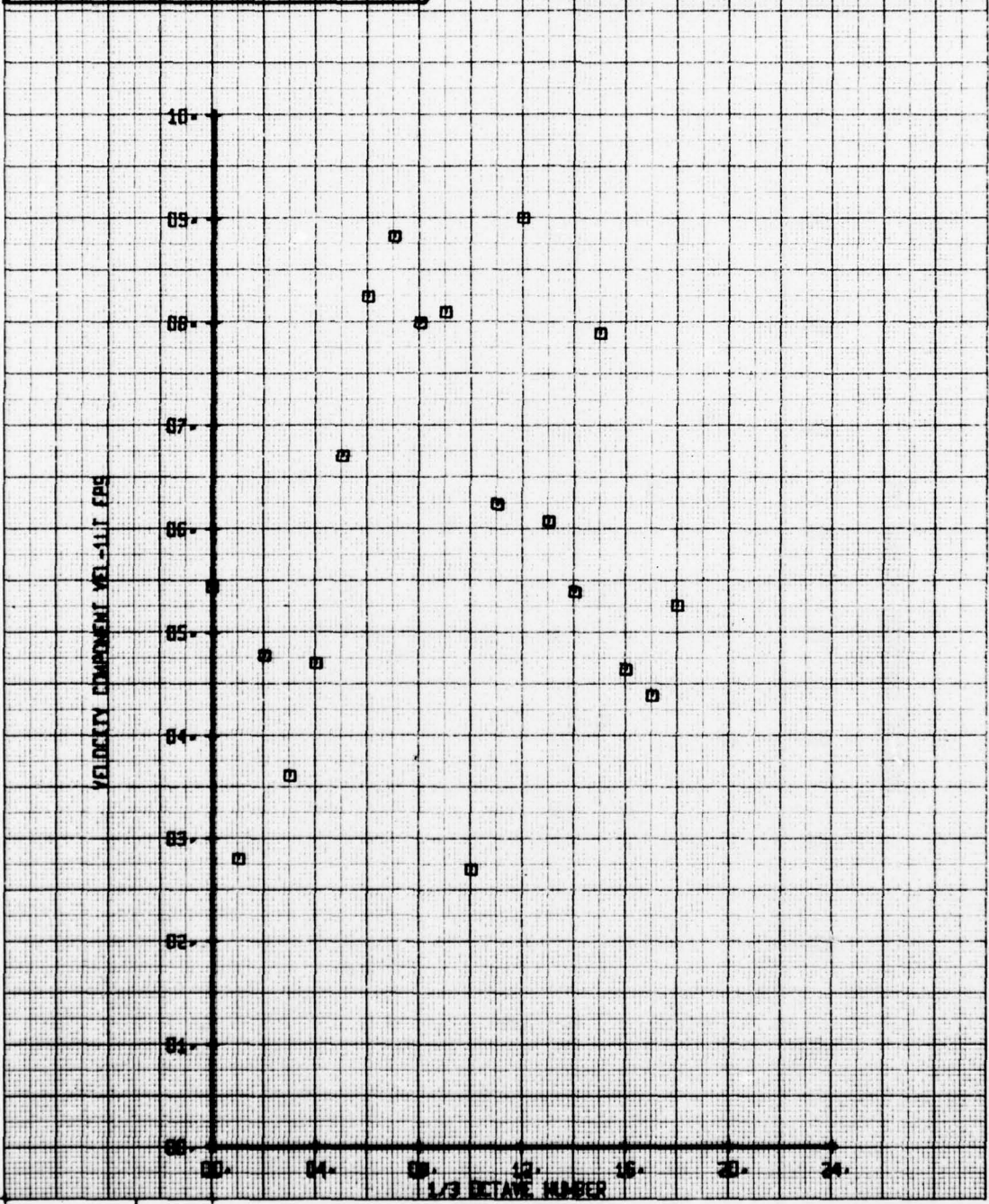
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/D-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 6

LEGEND
 SYM CH PARAMETER
 □ 73 VEL-1LT



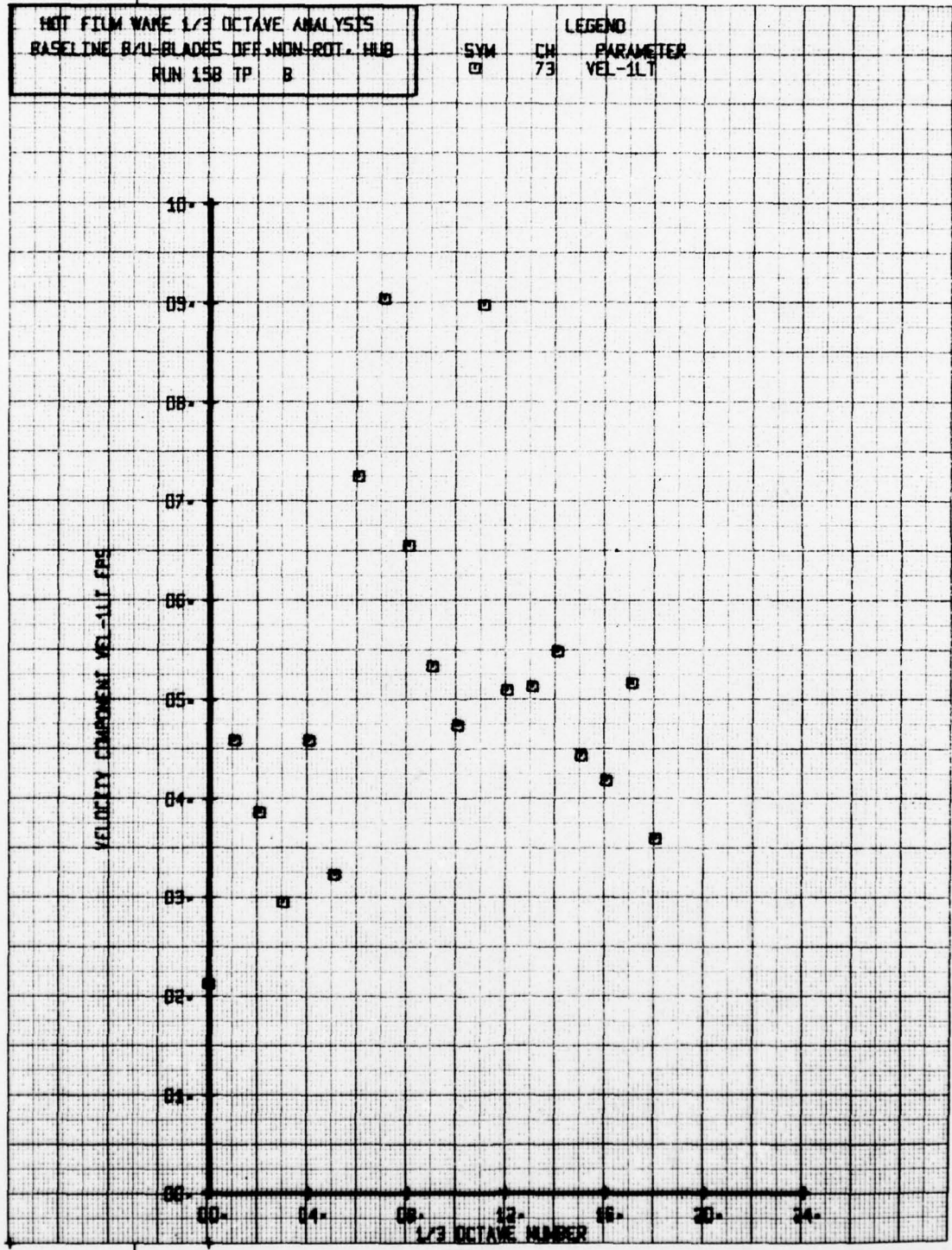
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADGES OFF, NON-ROT. HUB
 RUN 198 TP 7

SYN CH PARAMETER
 0 73 VEL-1LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8 1/2 BLADES OFF NON-ROT. HUB
 RUN 158 TP B

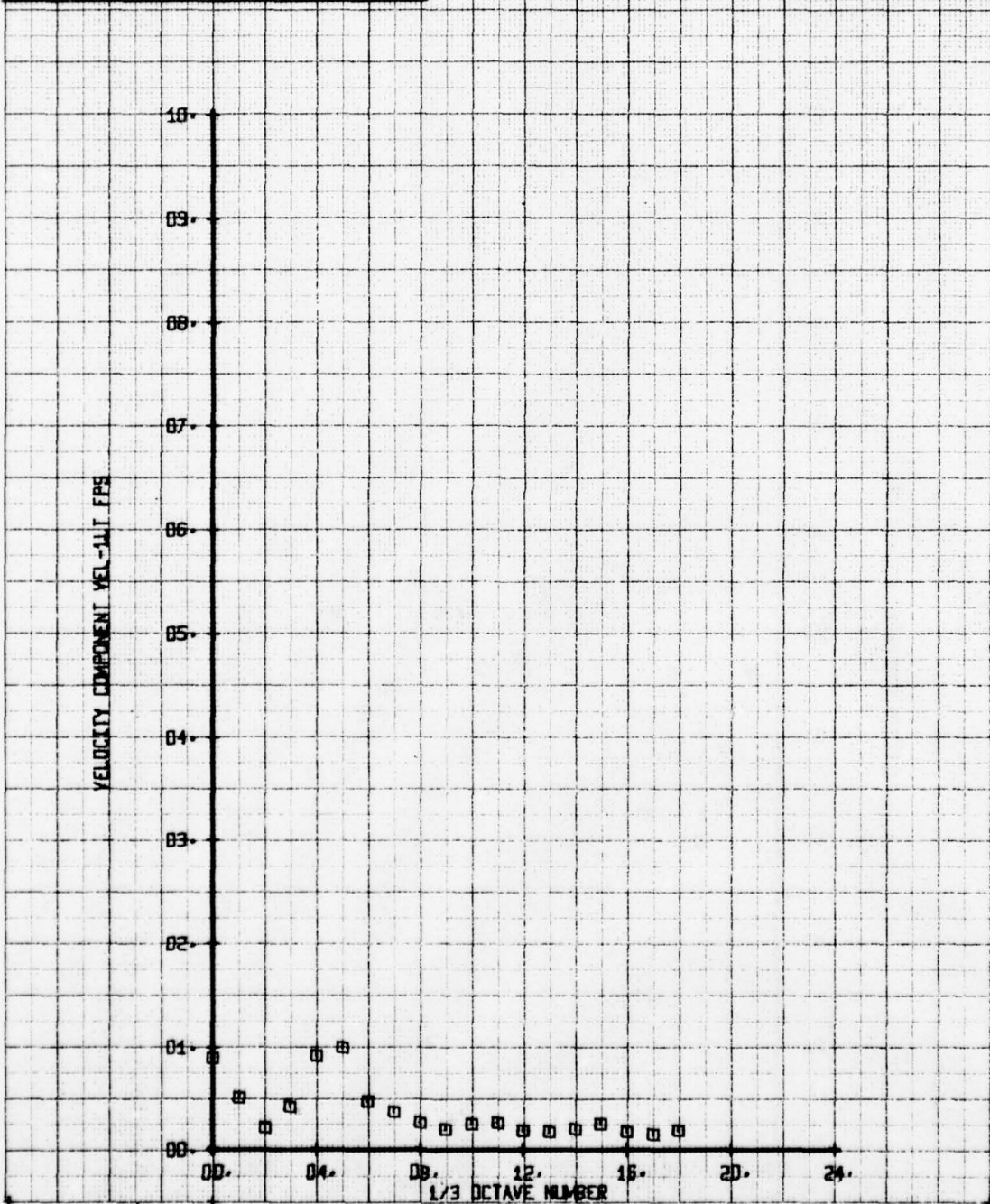
SYN CH PARAMETER
 □ 73 VEL-1LT



HOY FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/LI-BLADES OFF-NON-ROT. HUB
 RUN 158 TP 9

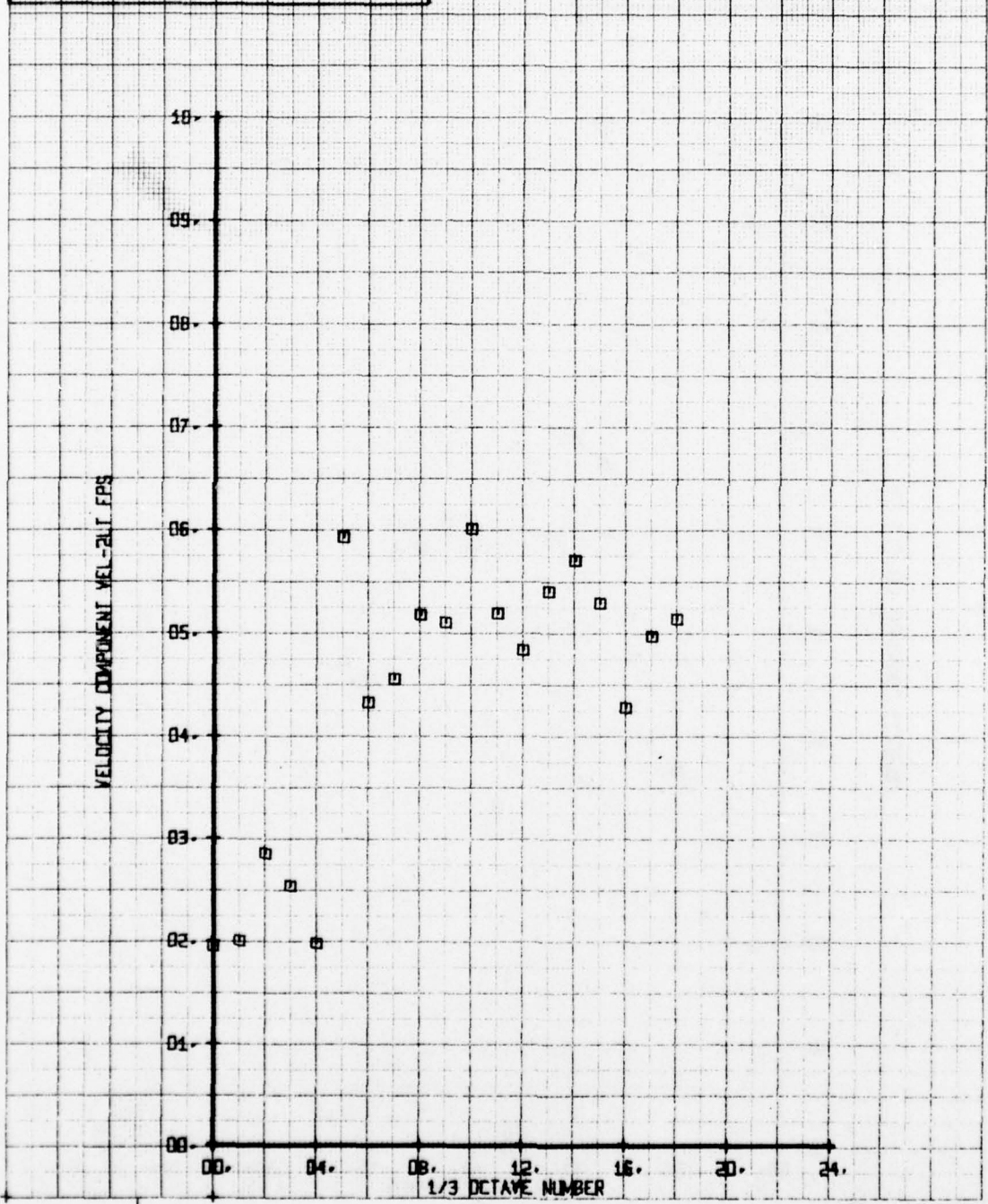
SYM	CH	PARAMETER
□	73	VEL-1LY

VELOCITY COMPONENT VEL-1LY FFS



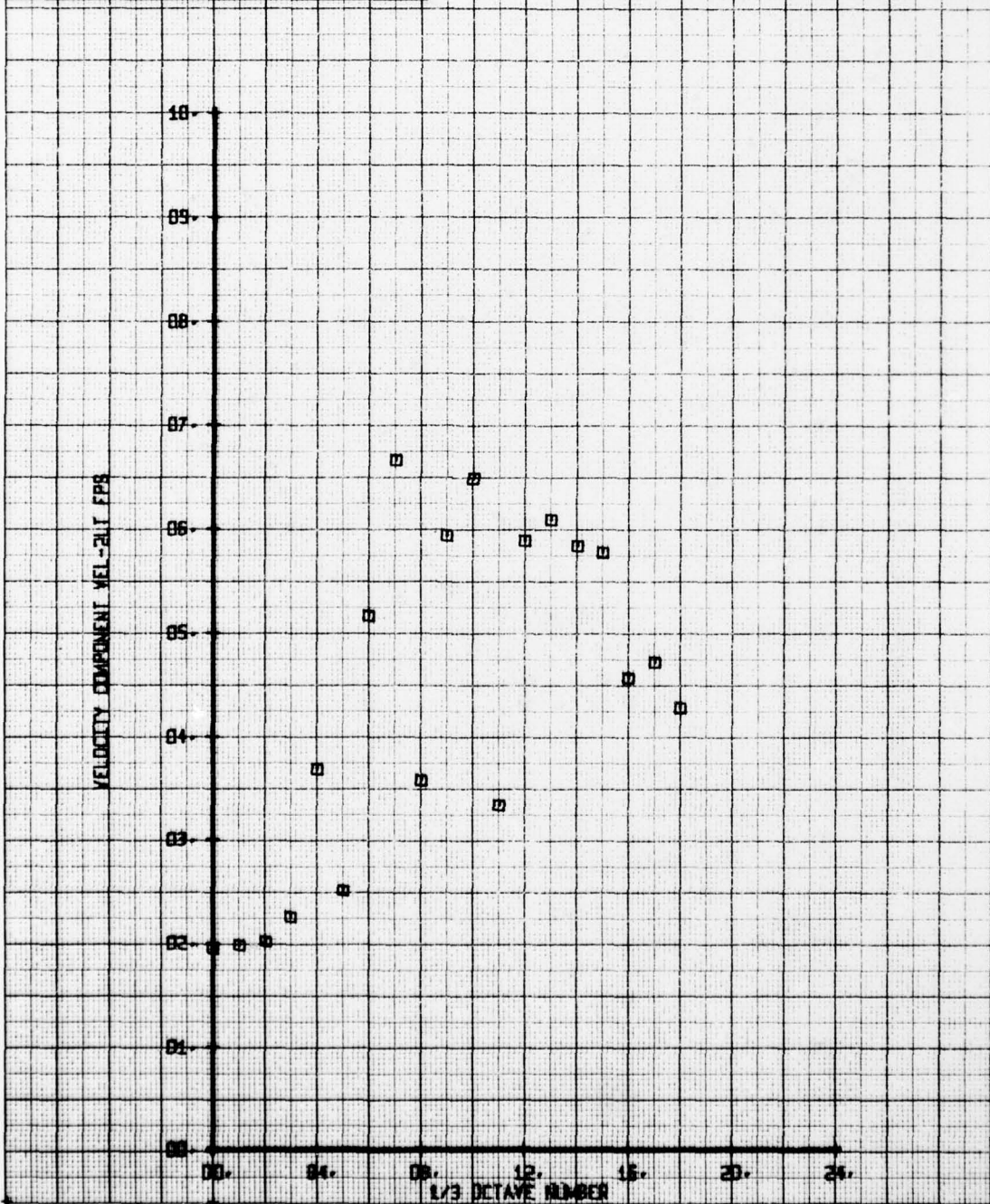
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/11-BLADES OFF, NON-ROT. MUR
 RUN 158 IP 2

SYM	CH	PARAMETER
□	72	VEL-2LT



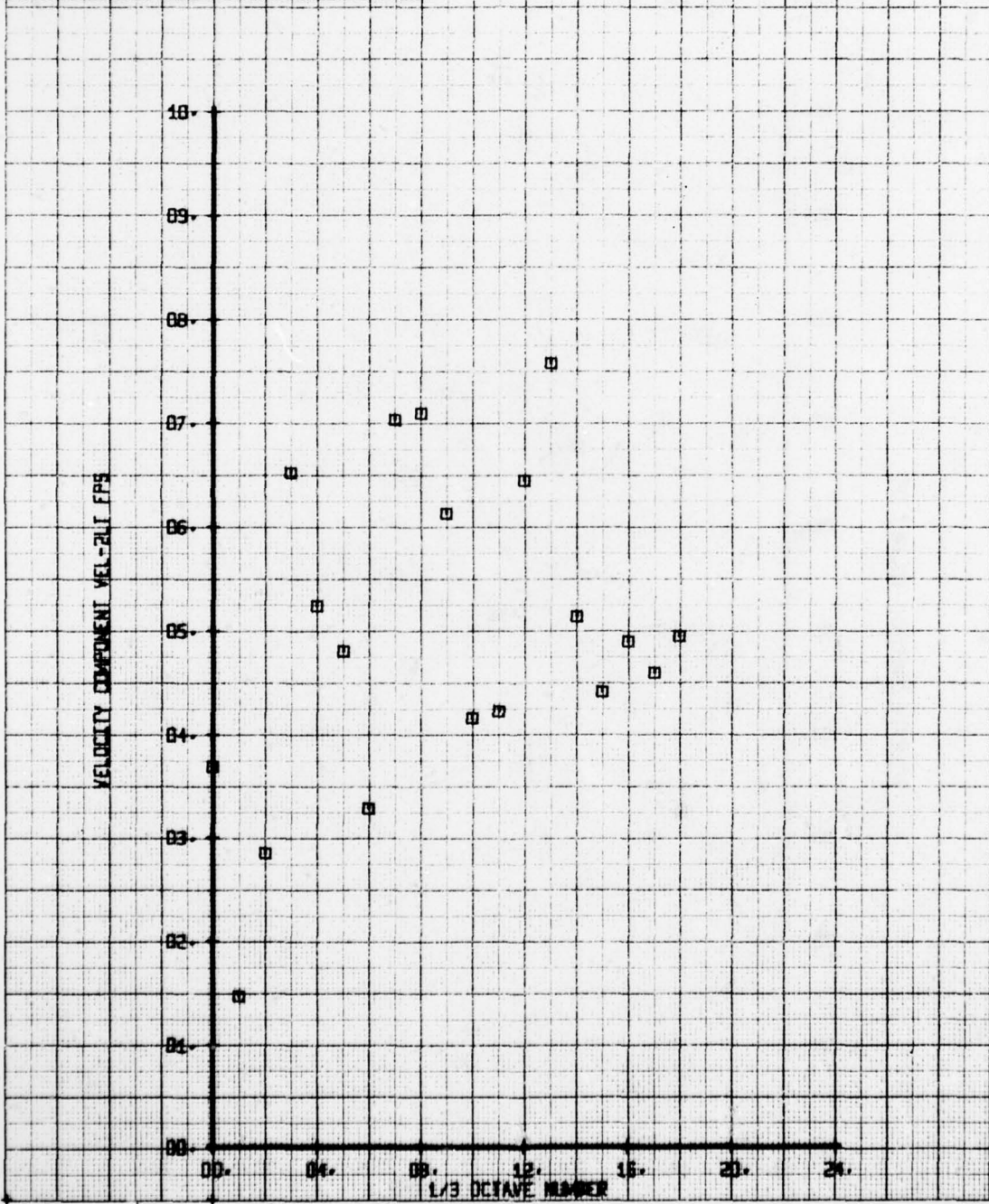
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11-BLADES DEF. NON-ROT. HUB
 RUN 158 TP 3

SYM 0 CH 72
 LEGEND
 PARAMETER
 VEL-2LT



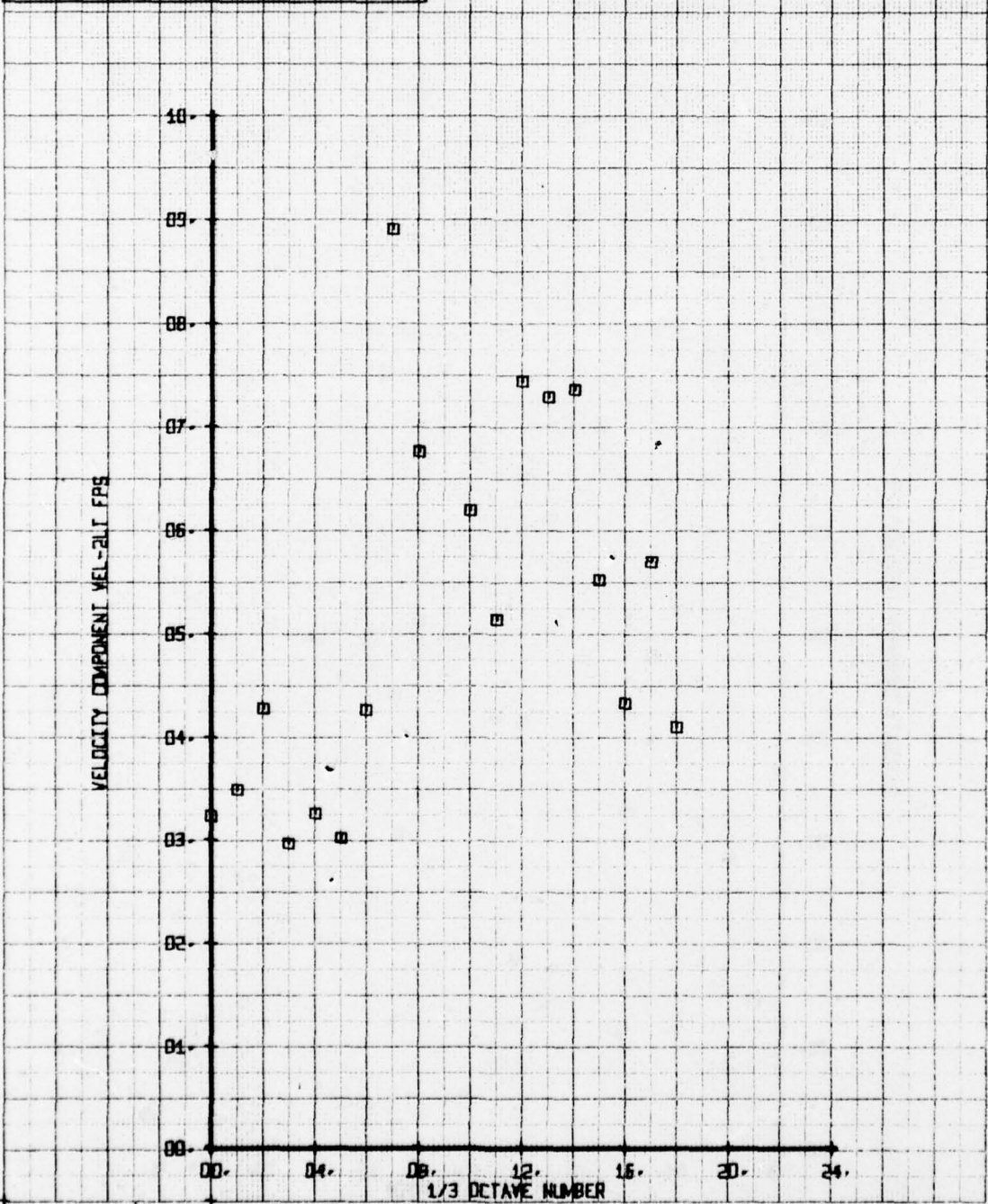
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 198 TP 4

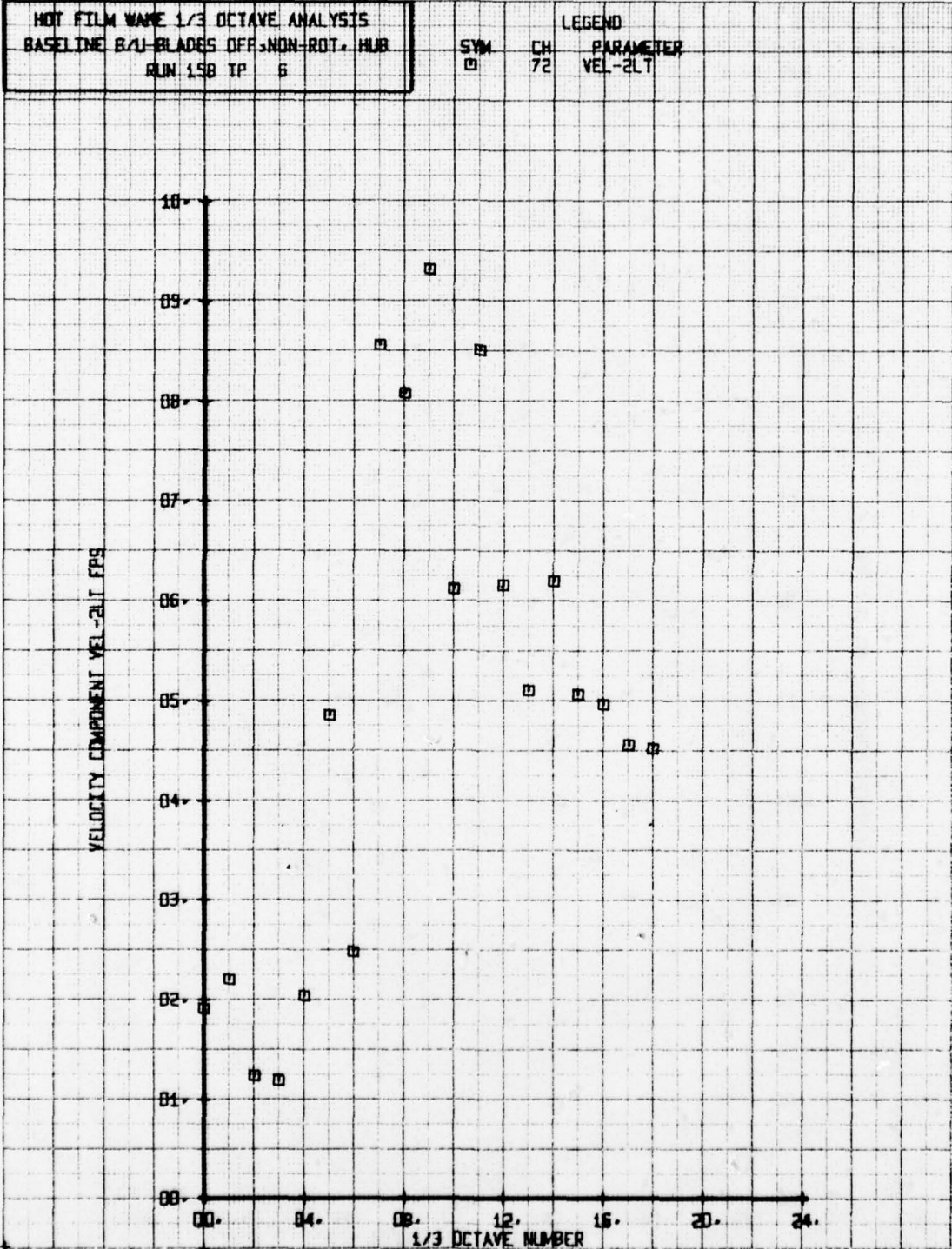
SYM CH PARAMETER
 □ 72 VEL-2LT



ROT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 5

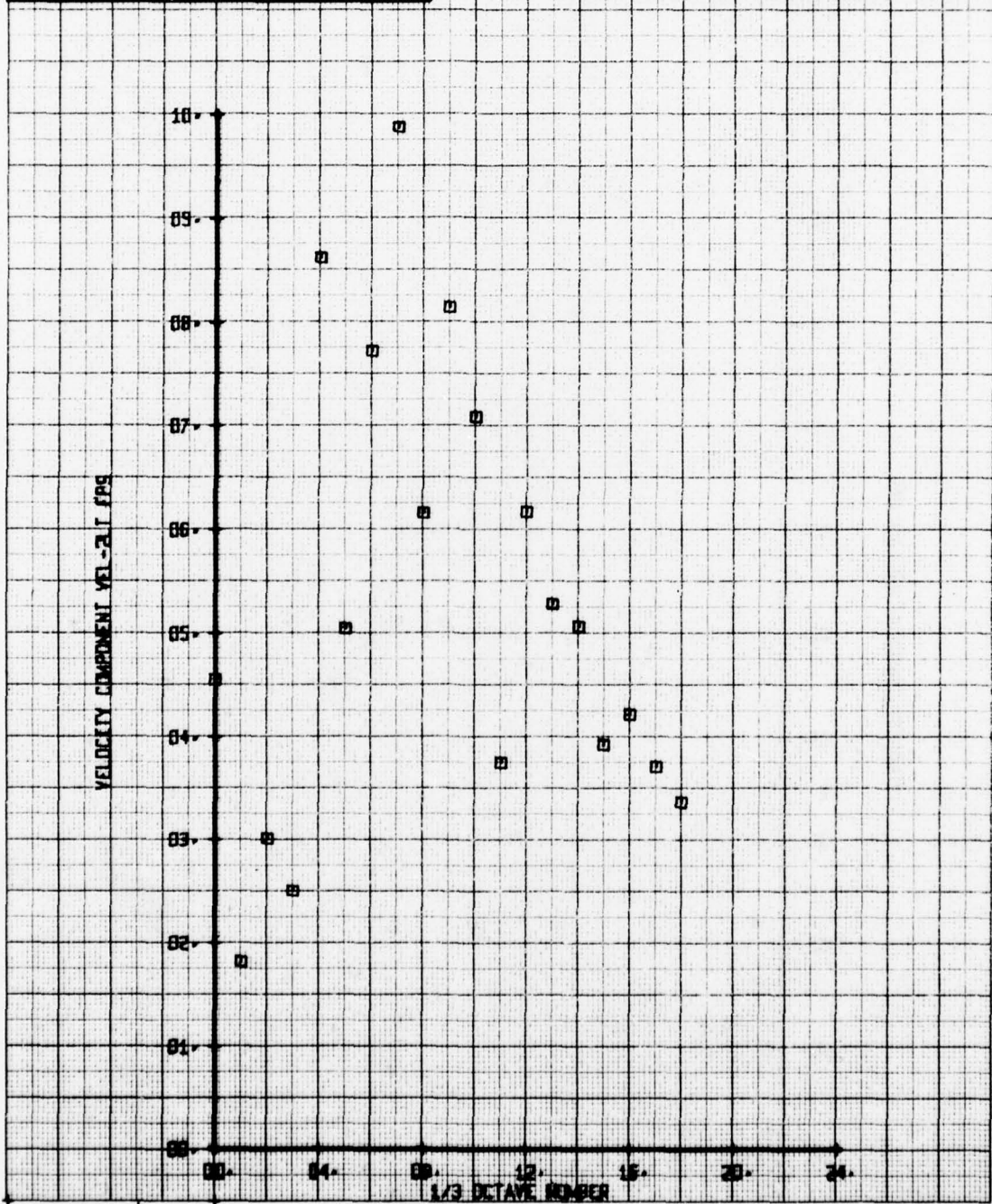
LEGEND
 CH PARAMETER
 72 VEL-2LT





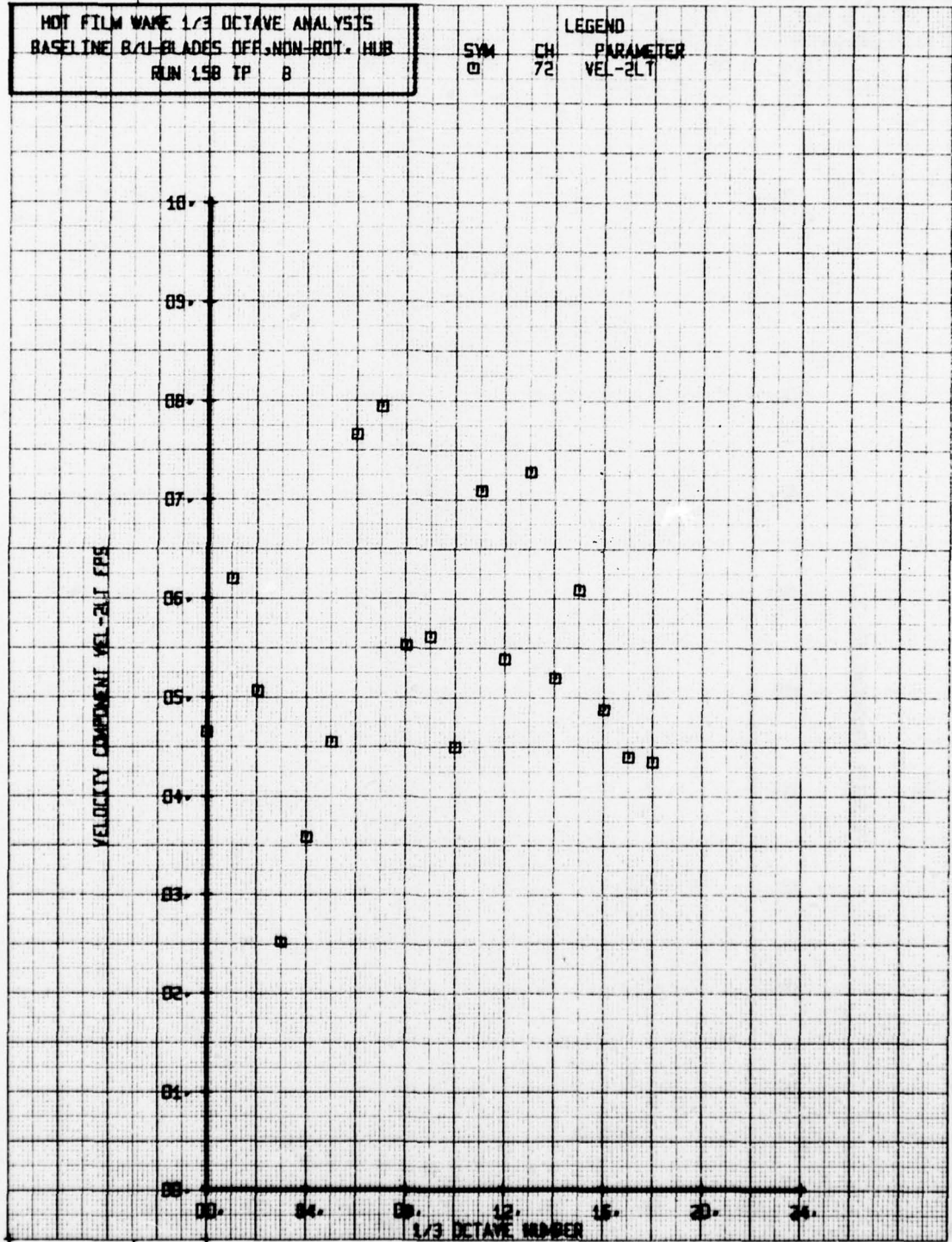
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP 7

LEGEND
 SYM CH PARAMETER
 □ 72 VEL-2LT



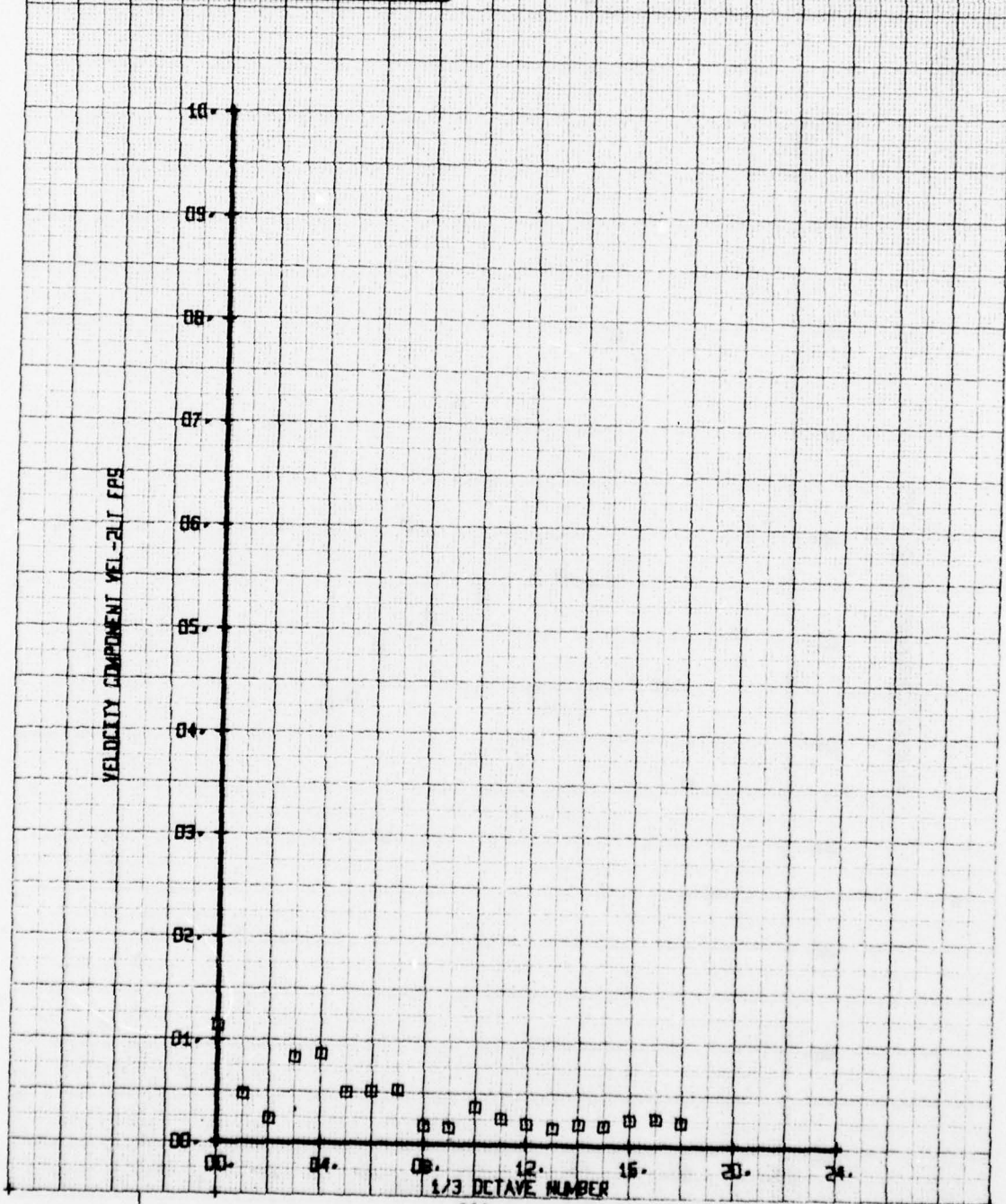
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT. HUB
 RUN 158 TP B

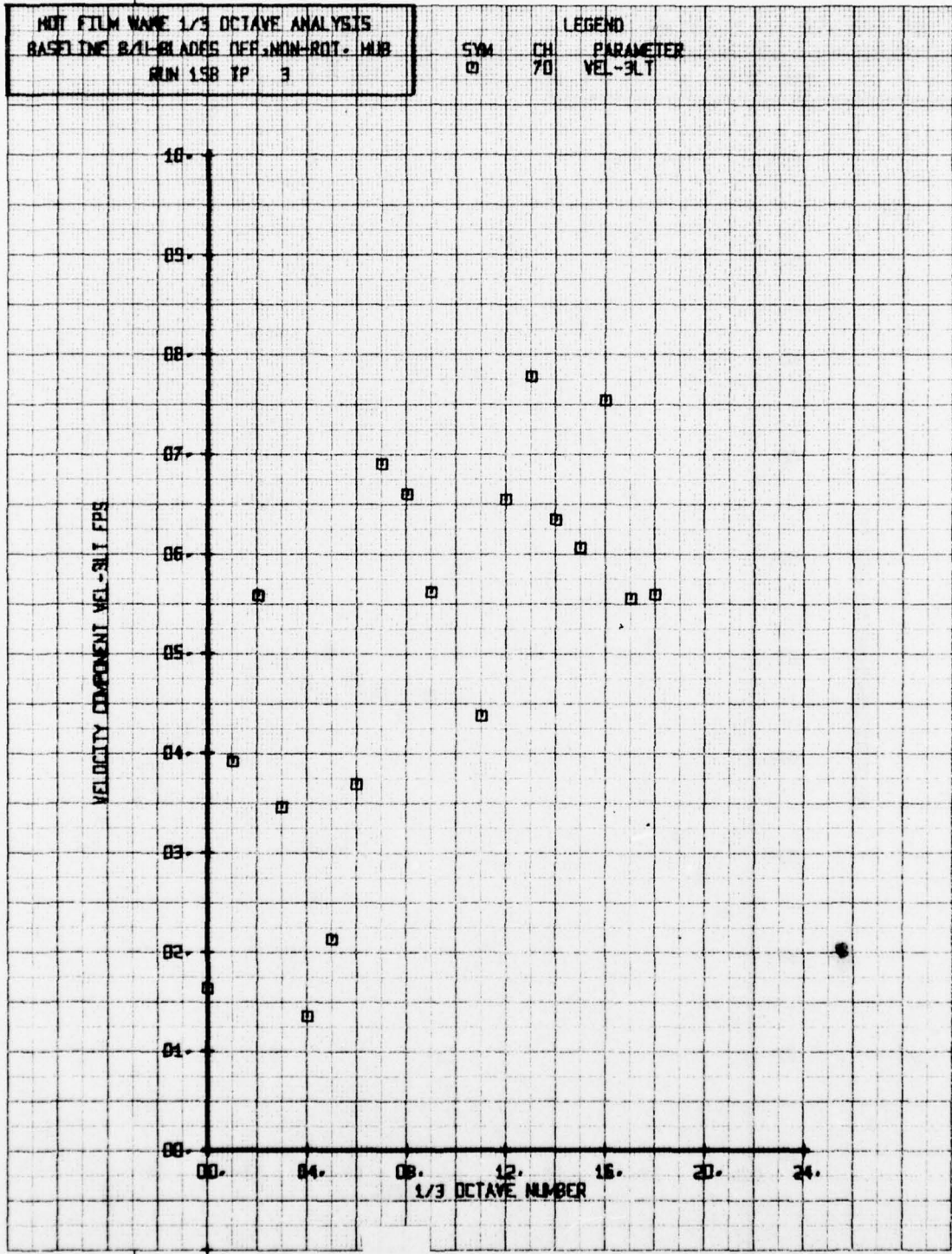
LEGEND
 SYM CH PARAMETER
 □ 72 VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, NON-ROT, HUB
 RUN 158 TP 9

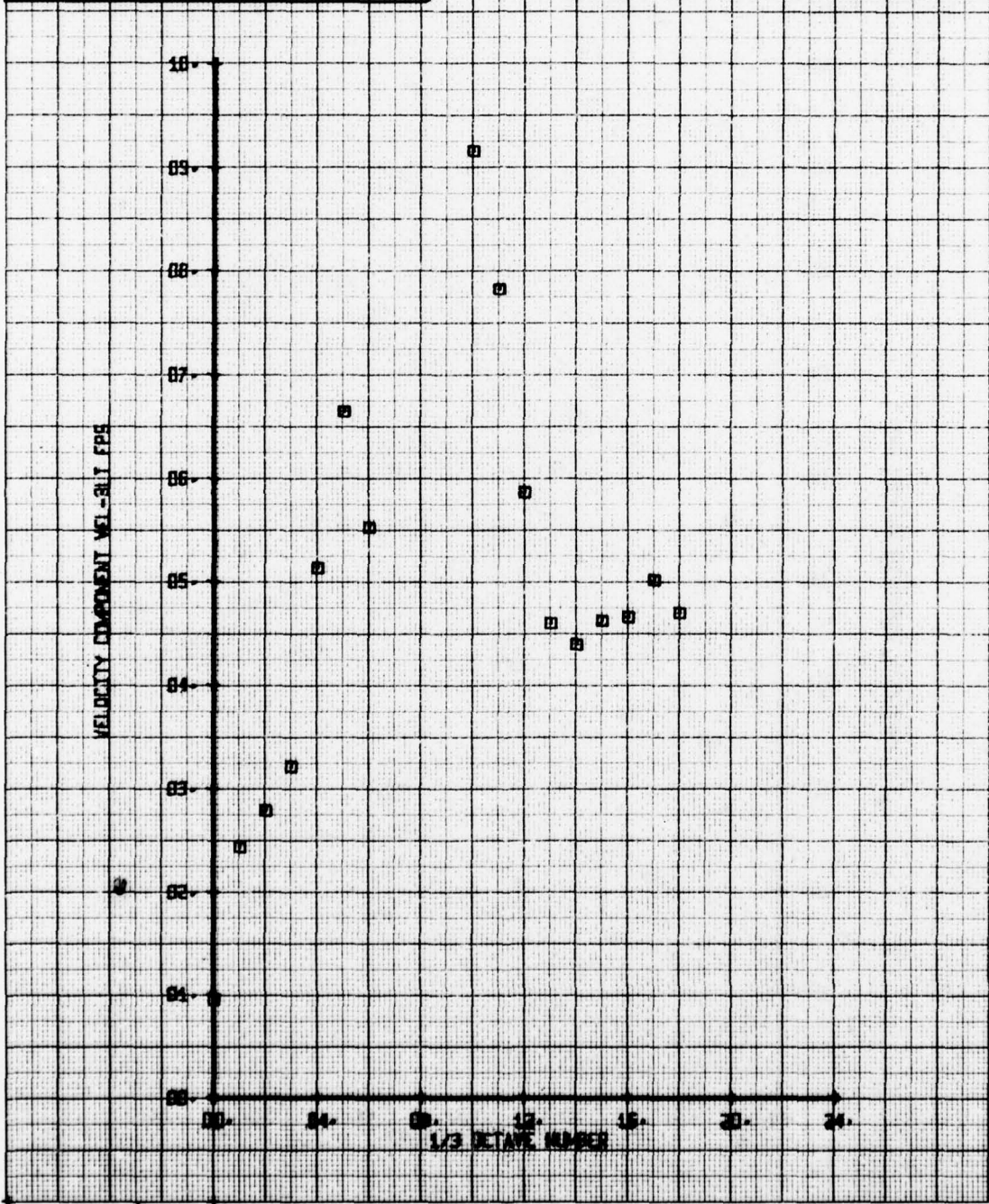
SYN CH PARAMETER
 0 72 VEL-2LT





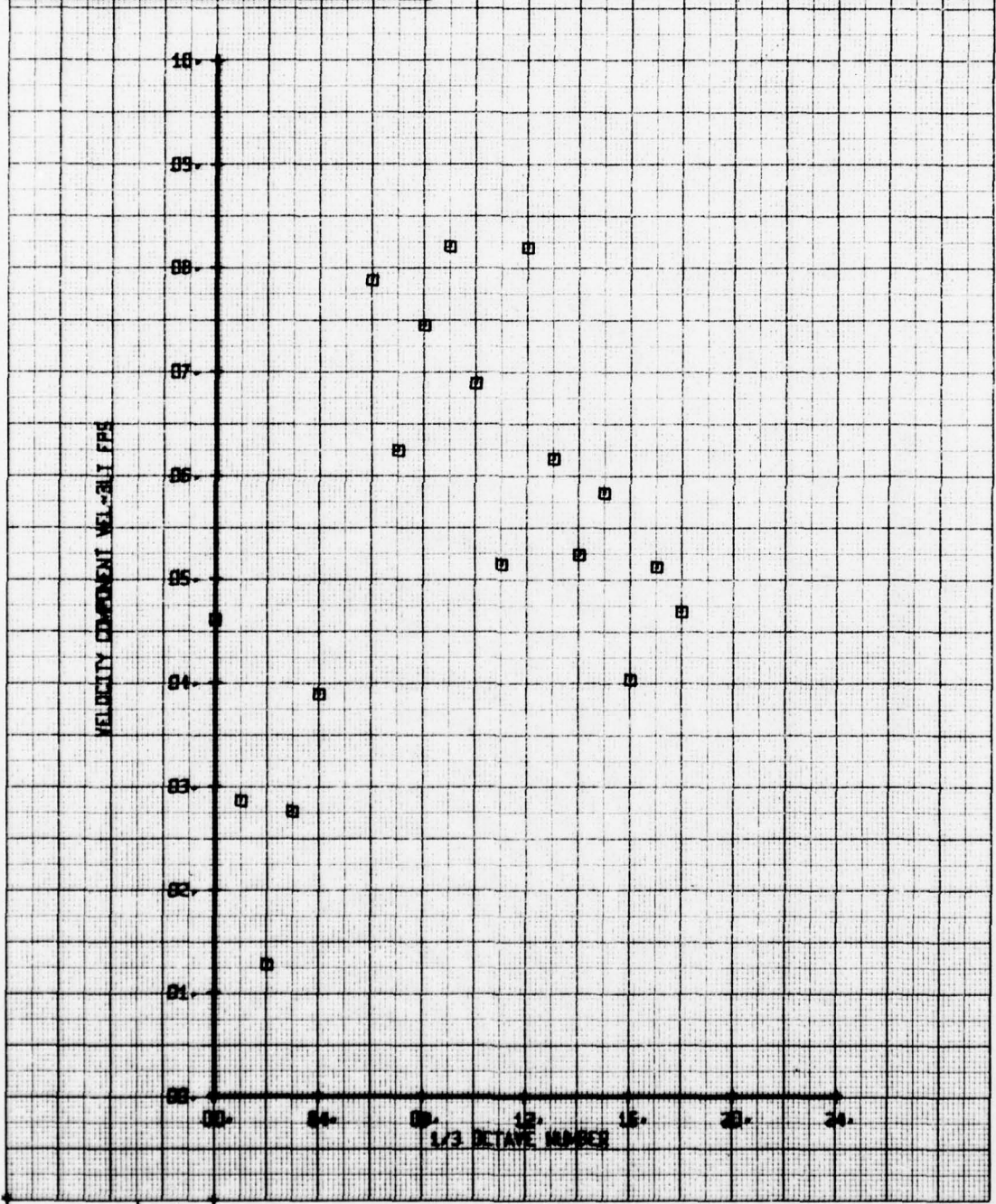
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8 1/2- BLADES DEF-NON-ROT. HUB
 RUN 158 TP 4

SYN CH PARAMETER
 @ 70 VEL-3LT



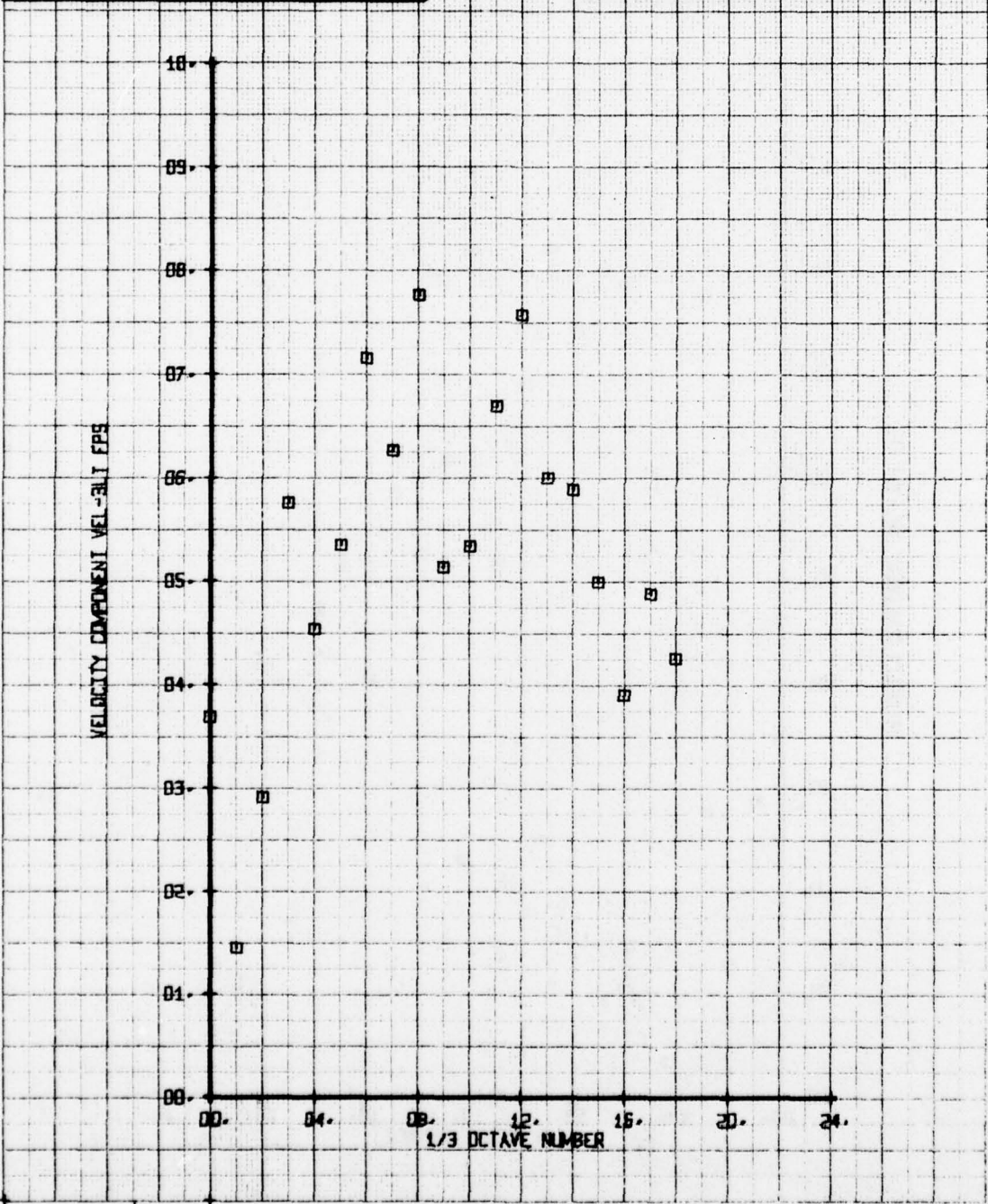
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/L BLADES OFF, NON-ROT. HUB
 RUN 158 TP 5

SYN CH PARAMETER
 0 70 VEL-3LT



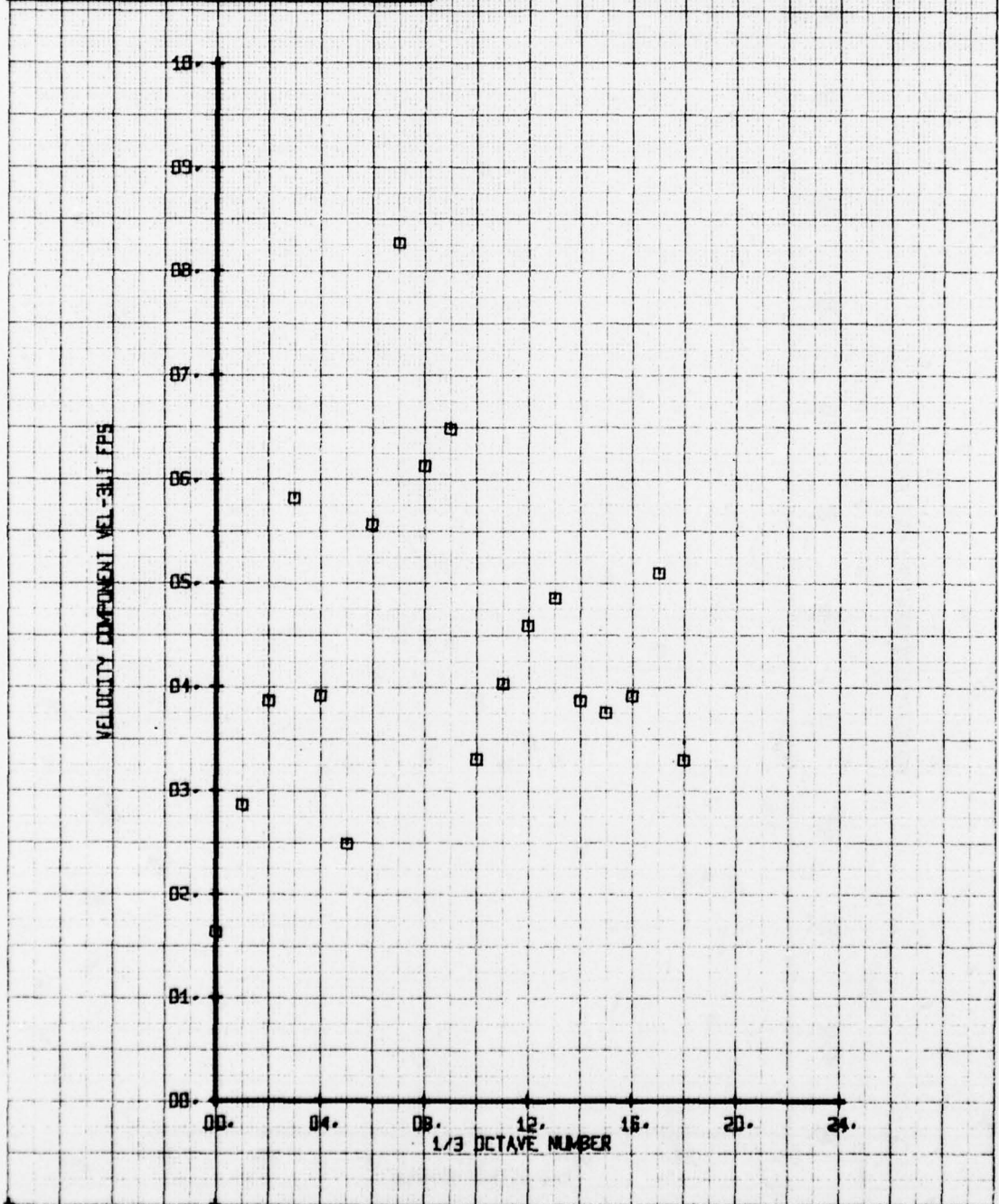
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE R/11-BLADES DEF. NON-ROT. HUB
 RUN 158 IP 6

SYN CH PARAMETER
 0 70 VEL-3LT



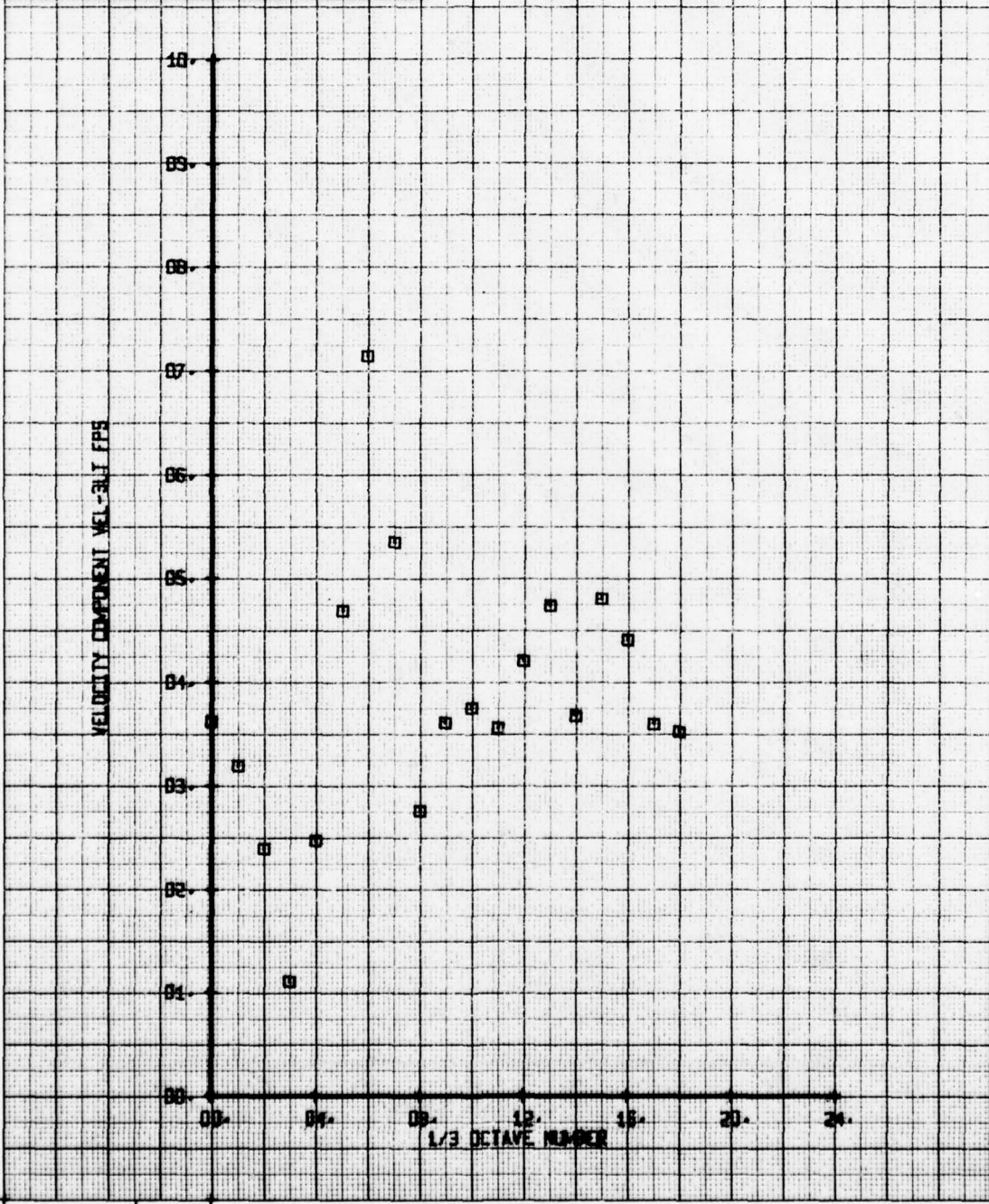
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/11-BLADDES OFF-NON-ROT. HUB
 RUN 158 TP 7

SYM	CH	PARAMETER
□	70	VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/11-BLADES OFF, NON-ROT. HUB
 RUN 198 TP 8

SYM CH PARAMETER
 U 70 VEL-3LT

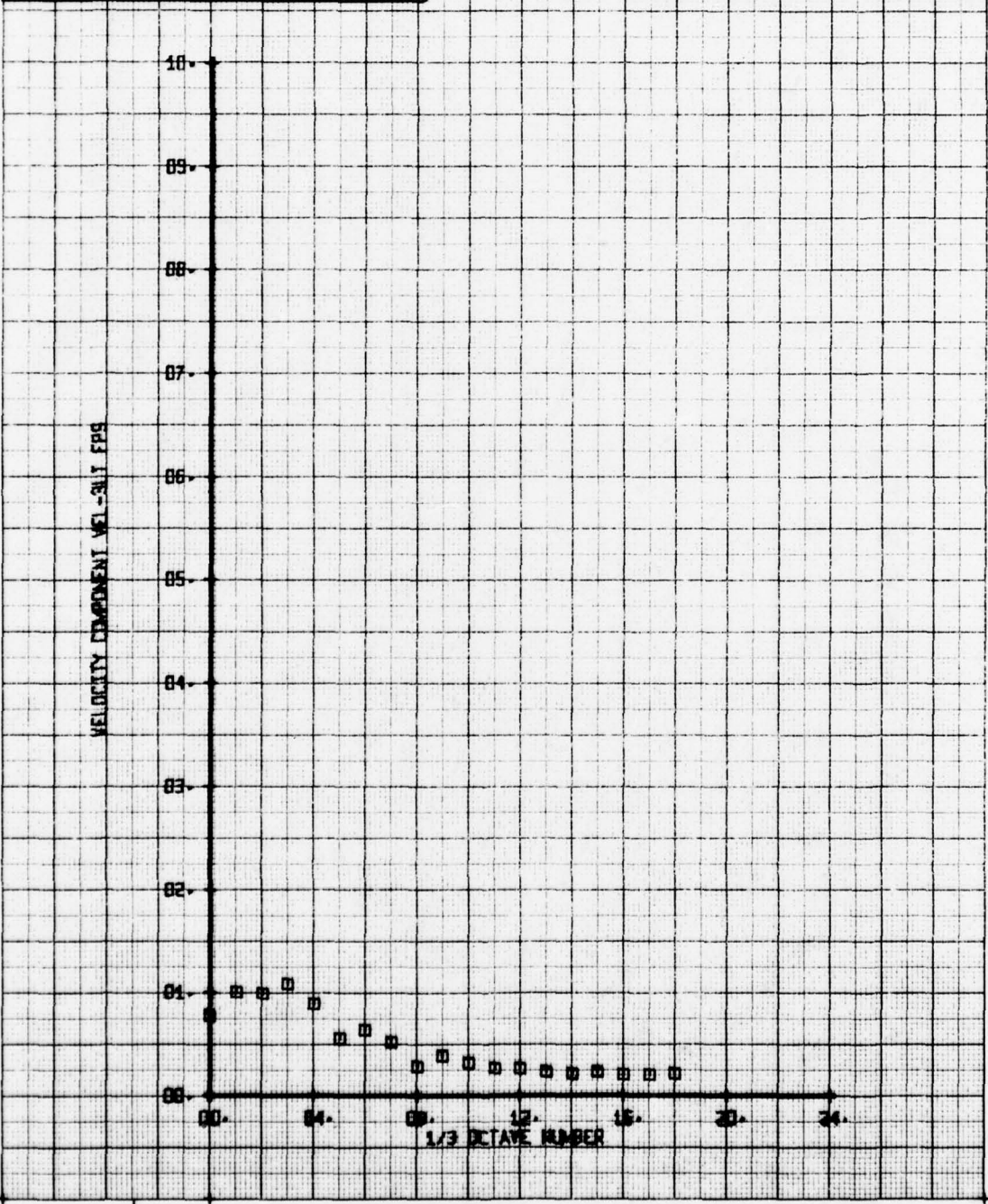


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11 BLADES DEF. NON-ROT. HUB
 RUN 158 TP 9

SYM
 □

CH
 70

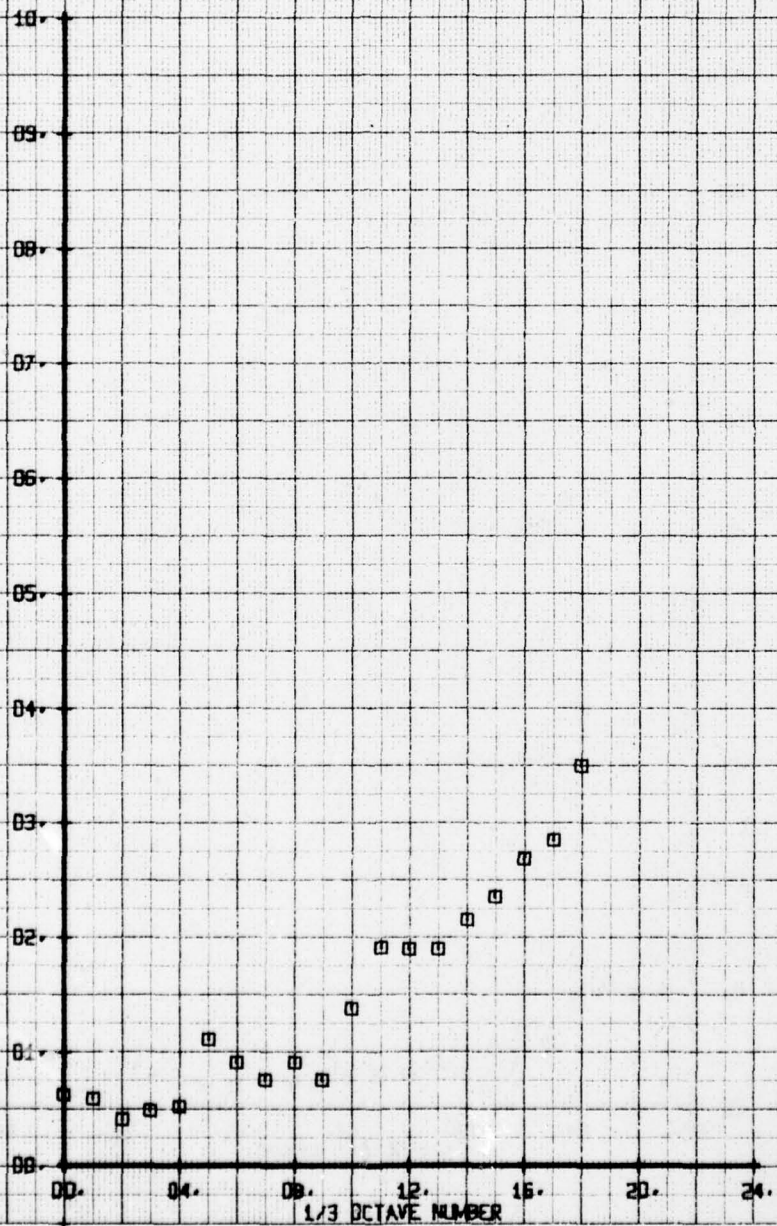
LEGEND
 PARAMETER
 VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/A1-BLADES OFF, HUB OFF
 RUN 159 TP 1

LEGEND	
SYM	CH
□	71
	PARAMETER
	VEL-3RT

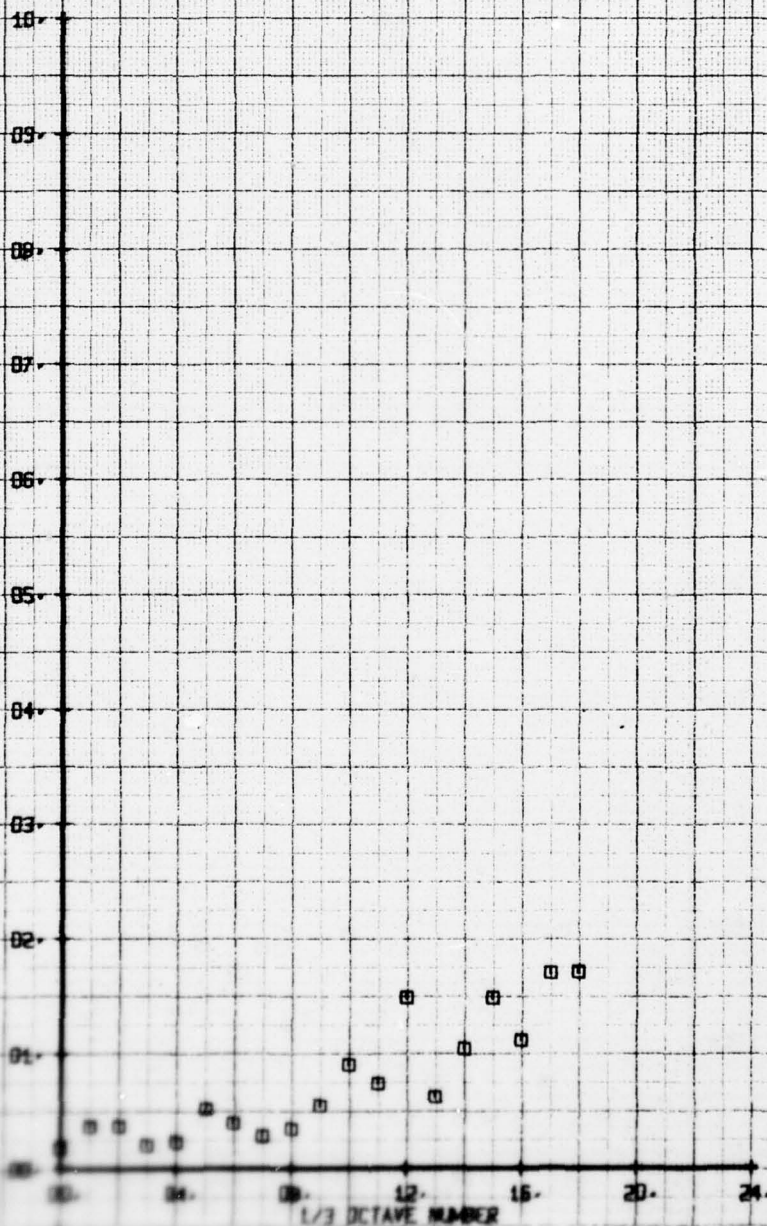
VELOCITY COMPONENT VEL-3RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/L-BLADES OFF, HUB OFF
RUN 159 TP 2

SYM	CH	PARAMETER
□	71	VEL-3RT

VELOCITY COMPONENT VEL-3RT FPS

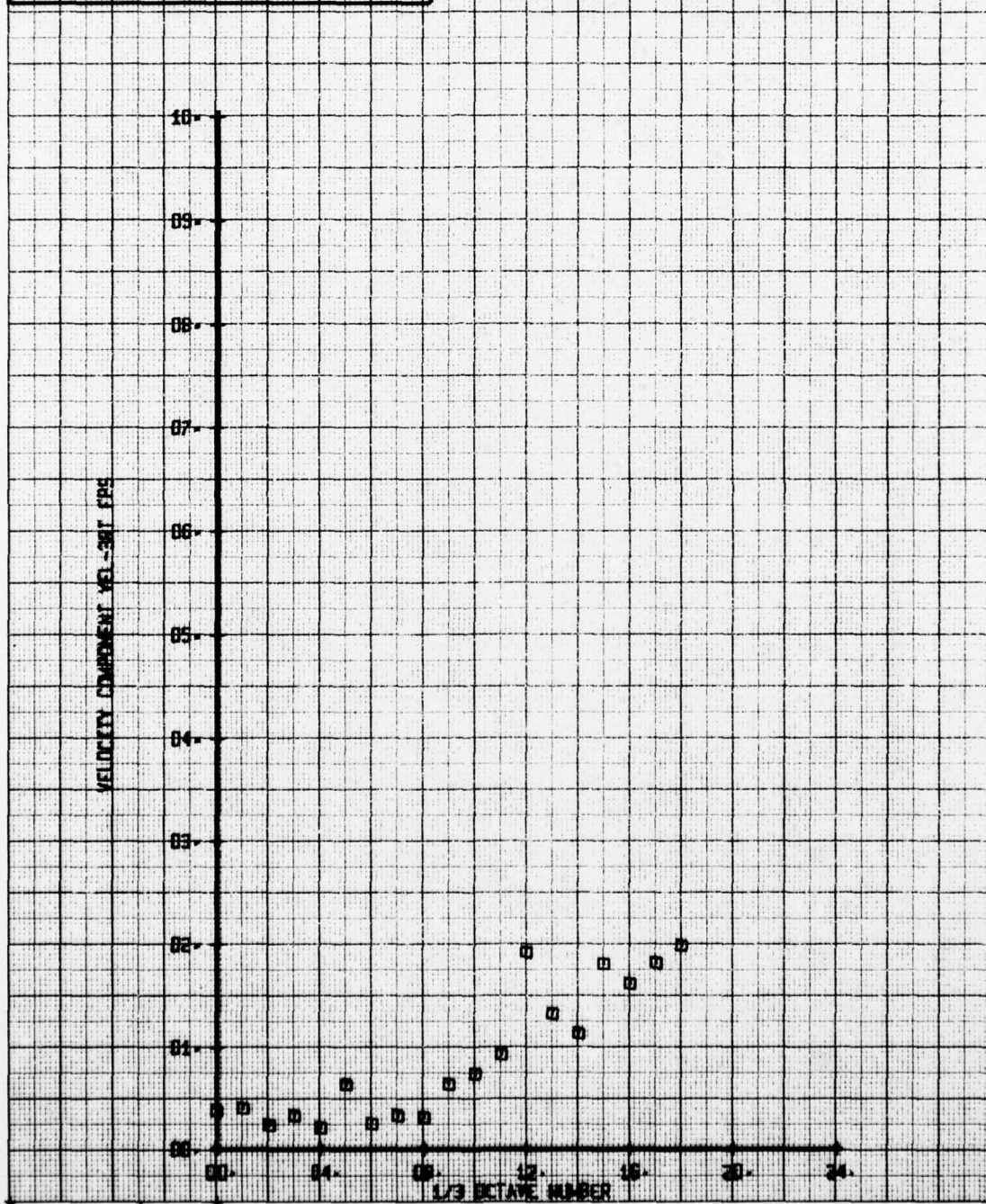


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BALL-BLADES OFF, HUB OFF
RUN 159 TP 3

SYM
G

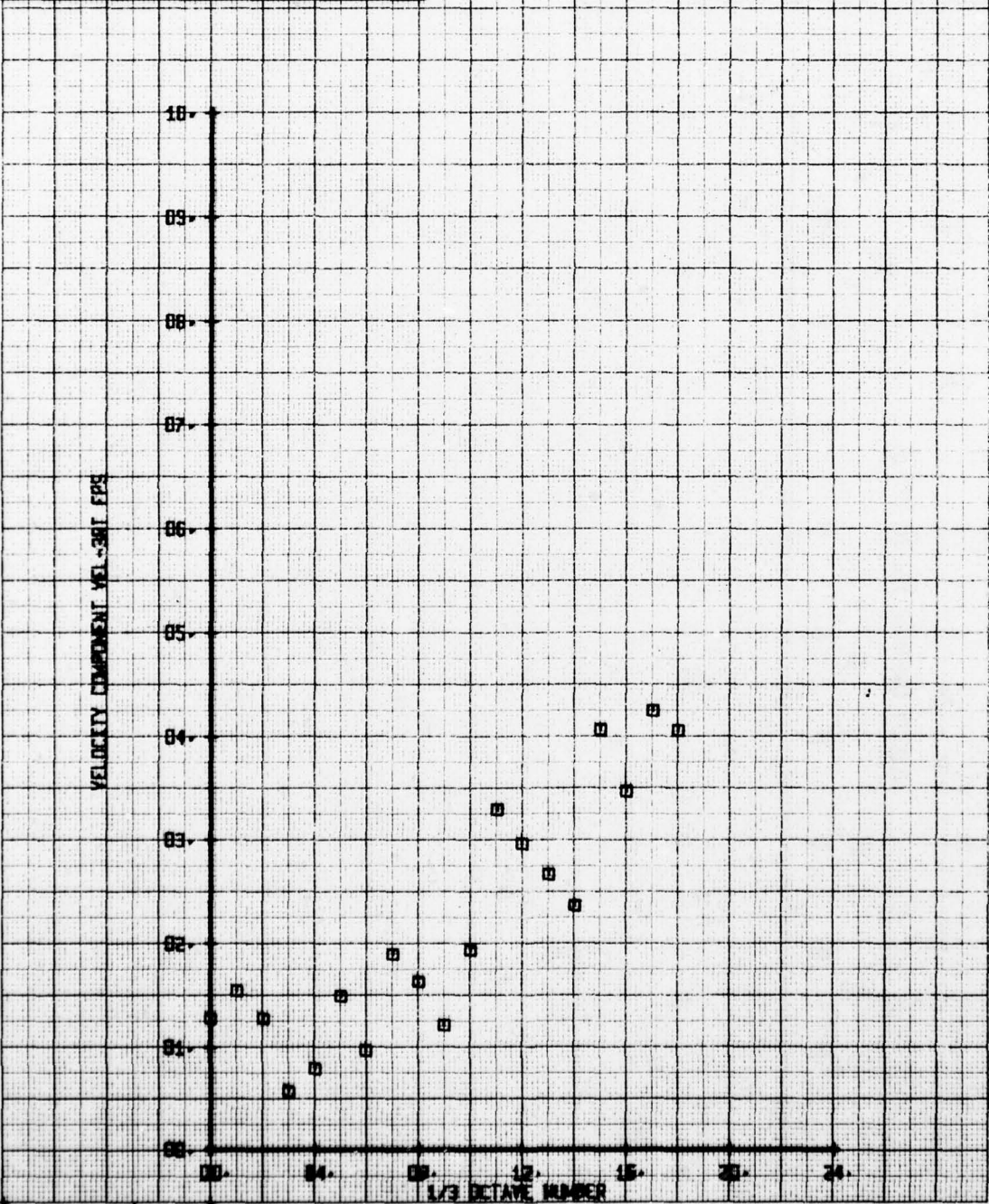
CH
71

LEGEND
PARAMETER
VEL-3RT



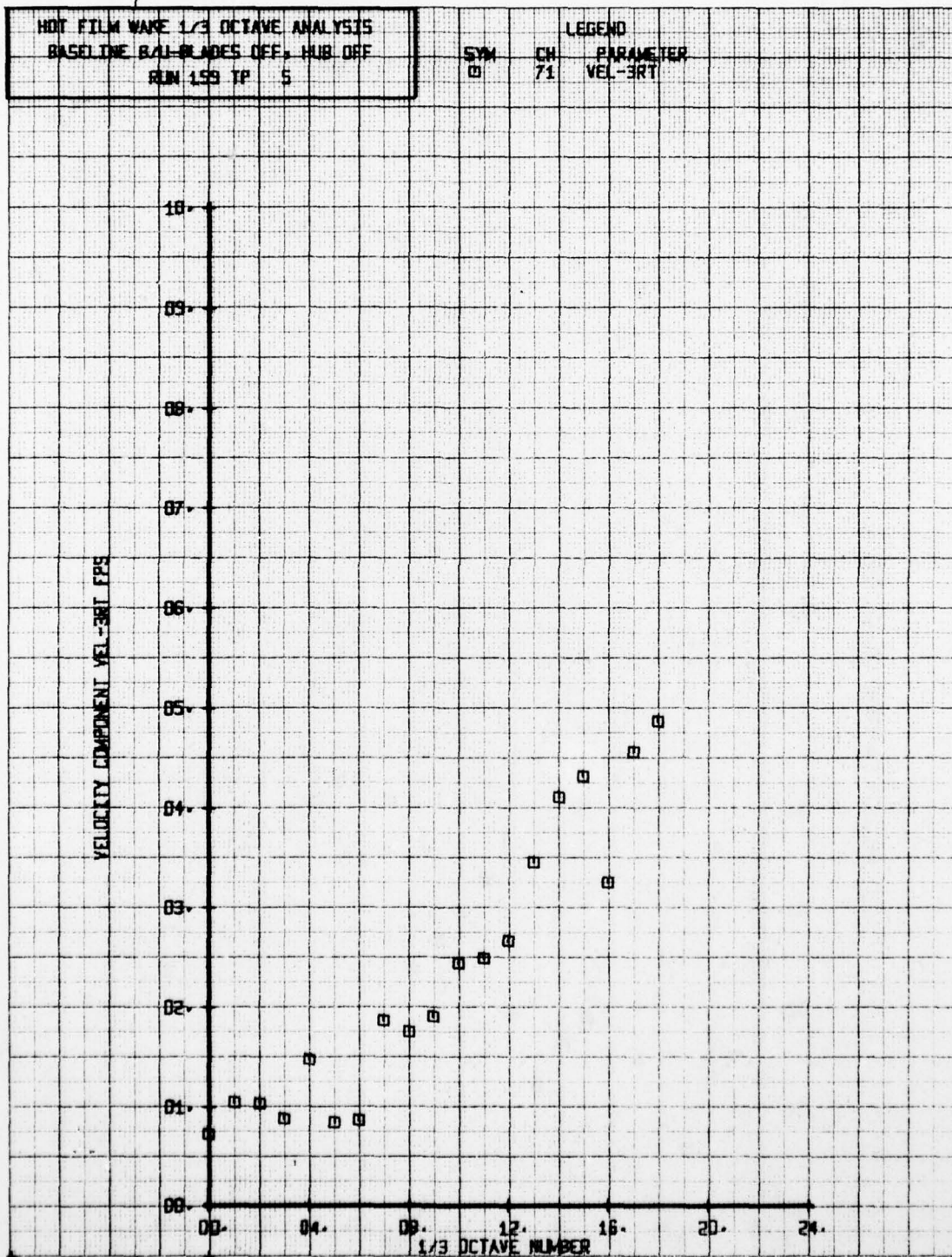
10T FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE BAU-BLADES OFF, HUB OFF
 RUN 159 TP 4

SVM	CH	PARAMETER
0	71	VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/L-BLADES OFF, HUB OFF
RUN 159 TP 5

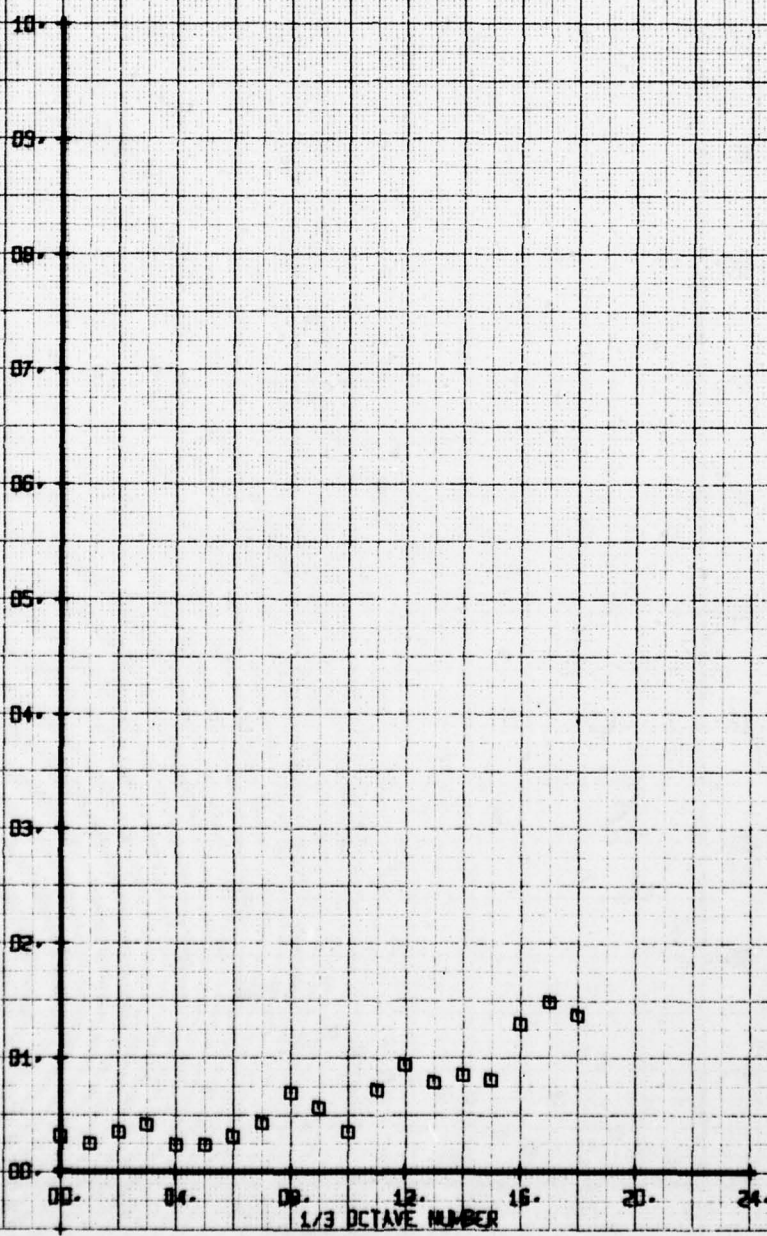
SYN CH PARAMETER
□ 71 VEL-3RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BAI-BLADES OFF, HUB OFF
RUN 159 TP 2

SYM	CH	PARAMETER
□	75	VEL-3RT

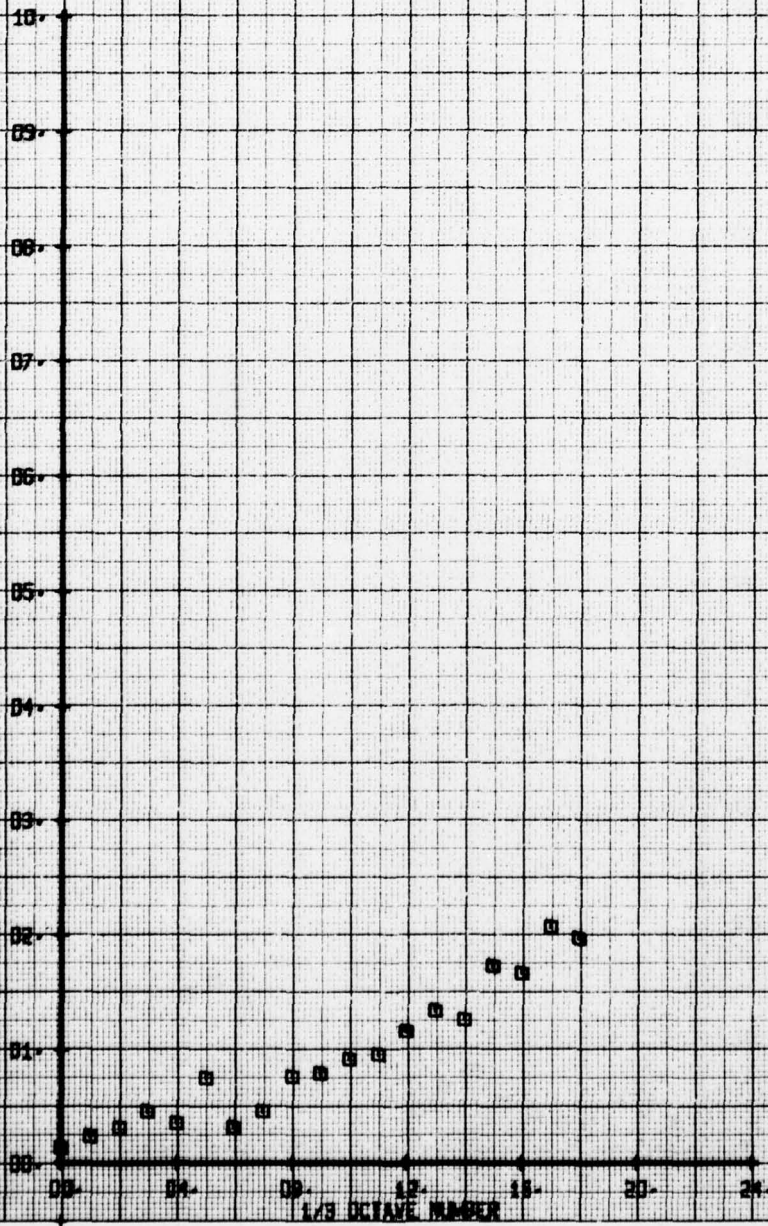
VELOCITY COMPONENT VEL-3RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/L-BLADES OFF, HUB OFF
RUN 159 TP 2

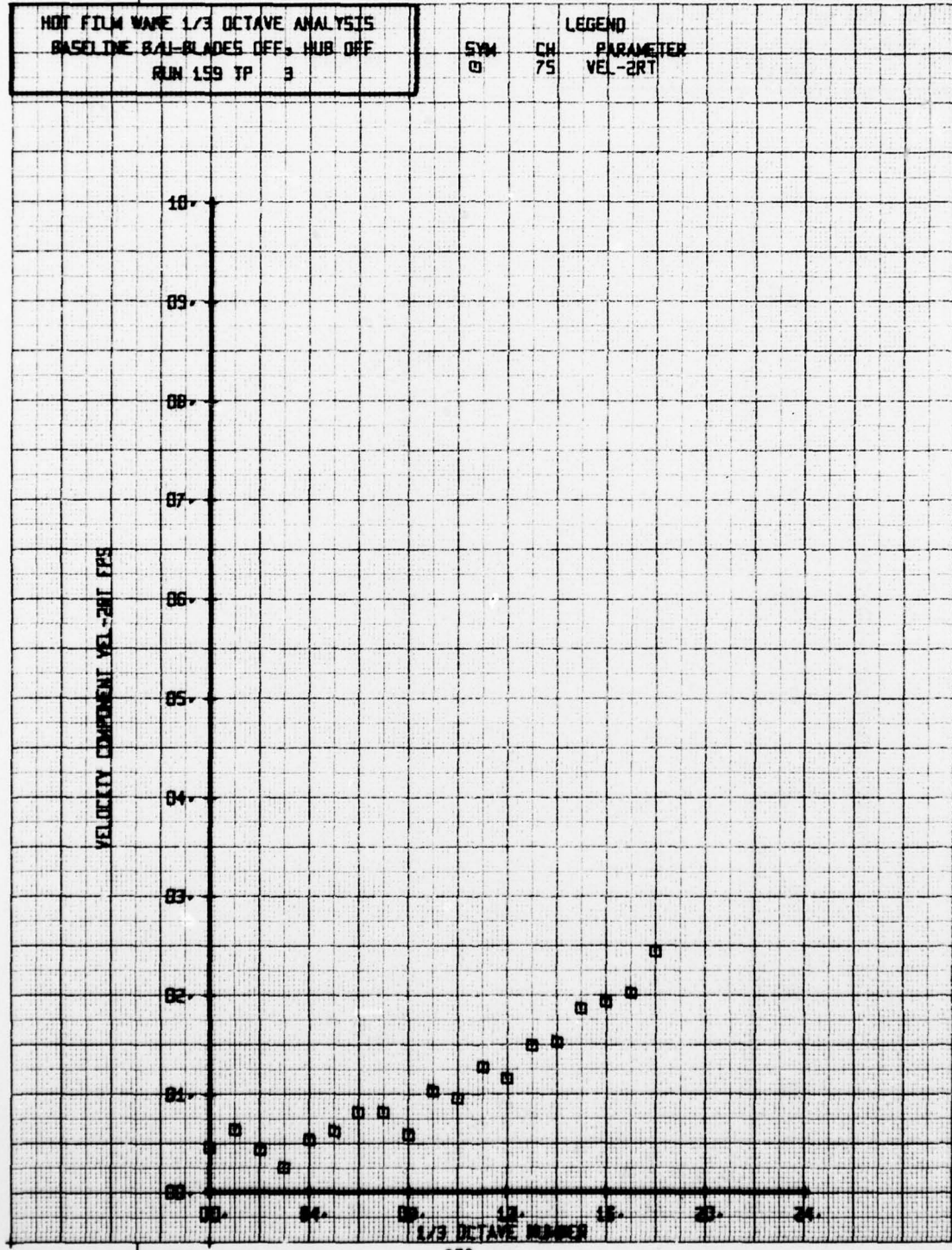
SYM	CH	PARAMETER
□	75	VEL-2RT

VELOCITY COMPONENT VEL-2RT FPS



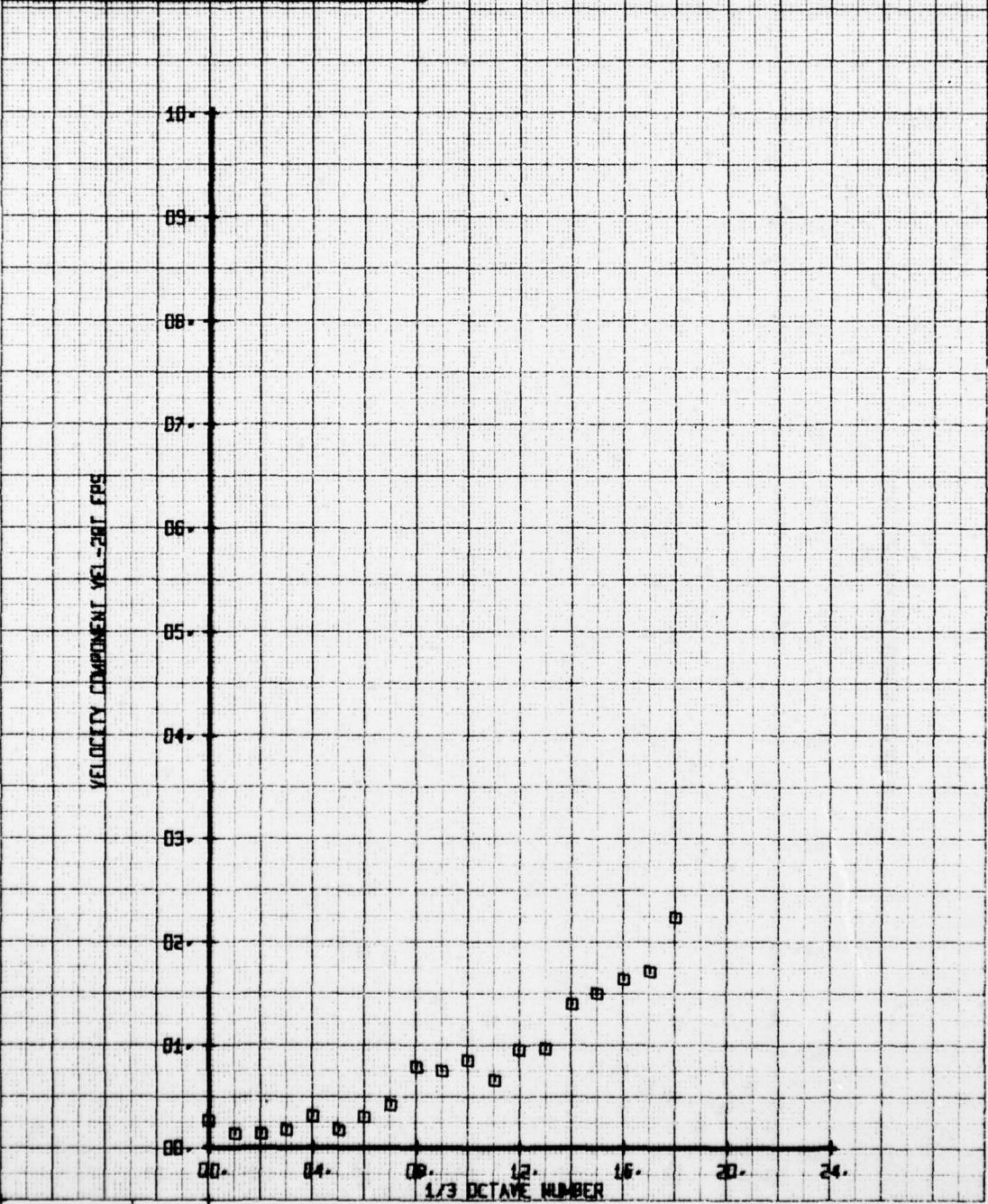
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 841-BLADES OFF, HUB OFF
 RUN 159 TP 3

SYM	CH	PARAMETER
□	75	VEL-2RT



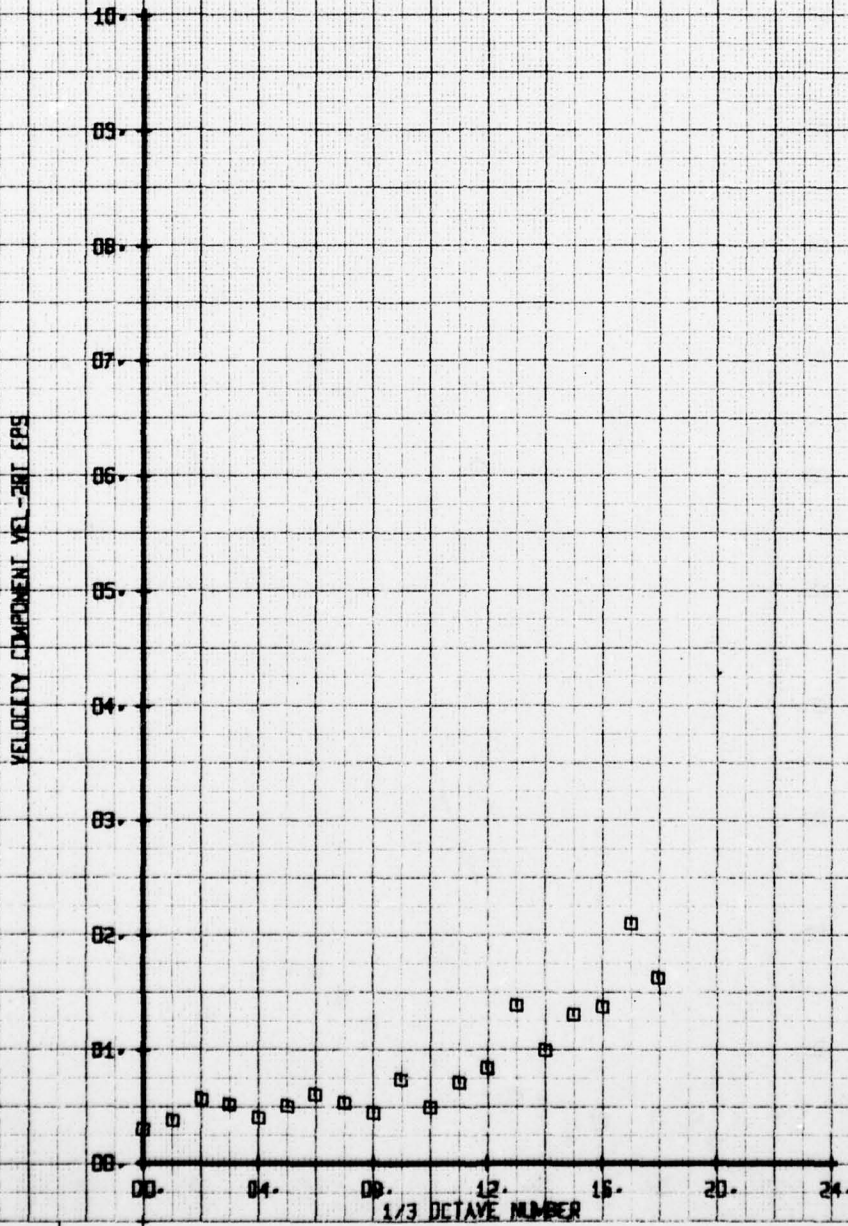
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BAL-BLADES OFF, HUB OFF
 RUN 159 TP 4

SYM	CH	PARAMETER
□	75	VEL-2RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/1-BLADES OFF, HUB OFF
RUN 159 TP 5

SYM	CH	PARAMETER
□	75	VEL-2RT

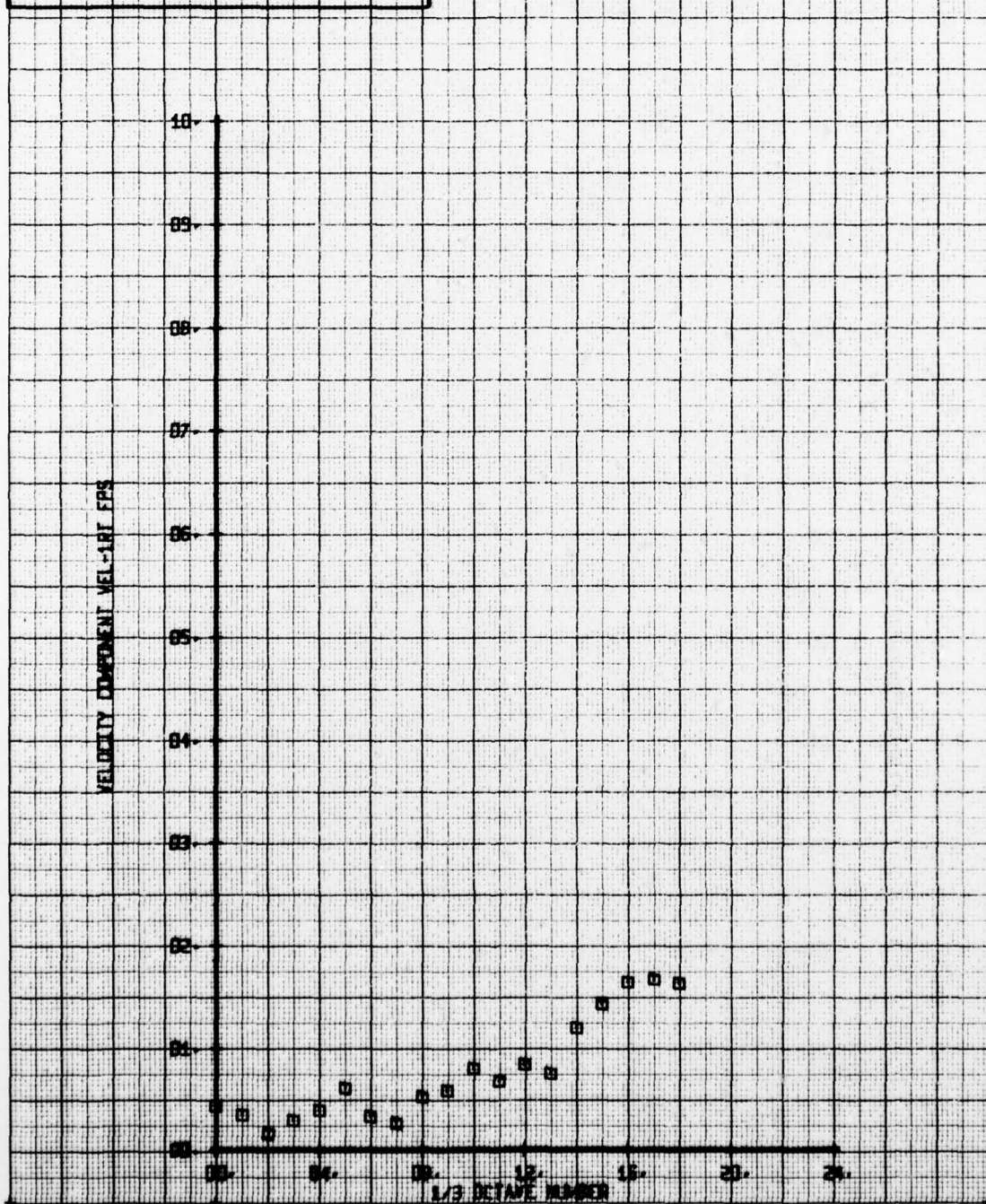


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/11-BLADES OFF, HUB OFF
RUN 159 TP 1

SYM
0

CH
74

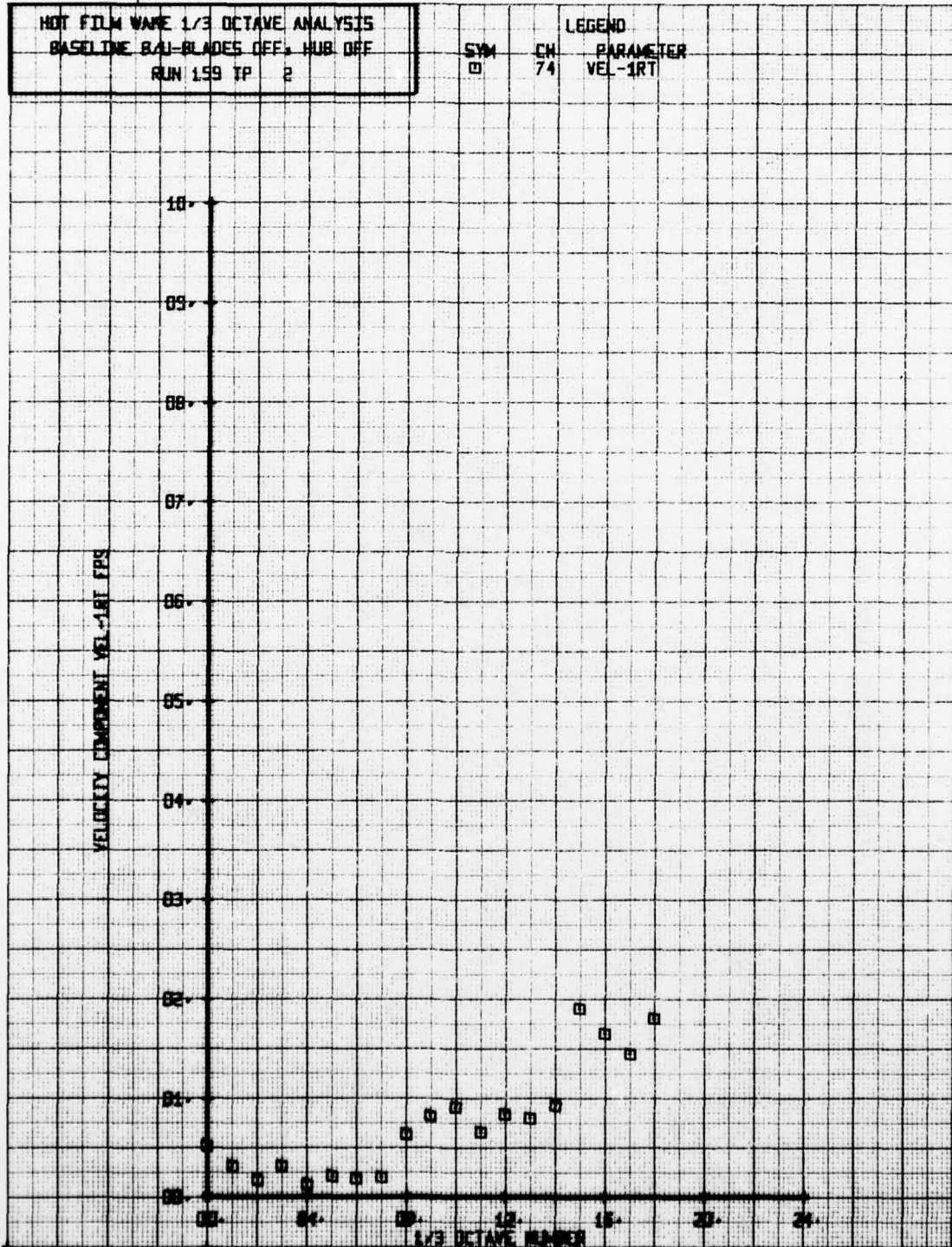
LEGEND
PARAMETER
VEL-1RT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 84J-BLADES OFF, HUB OFF
RUN 159 TP 2

SYM	CH	PARAMETER
□	74	VEL-1RT

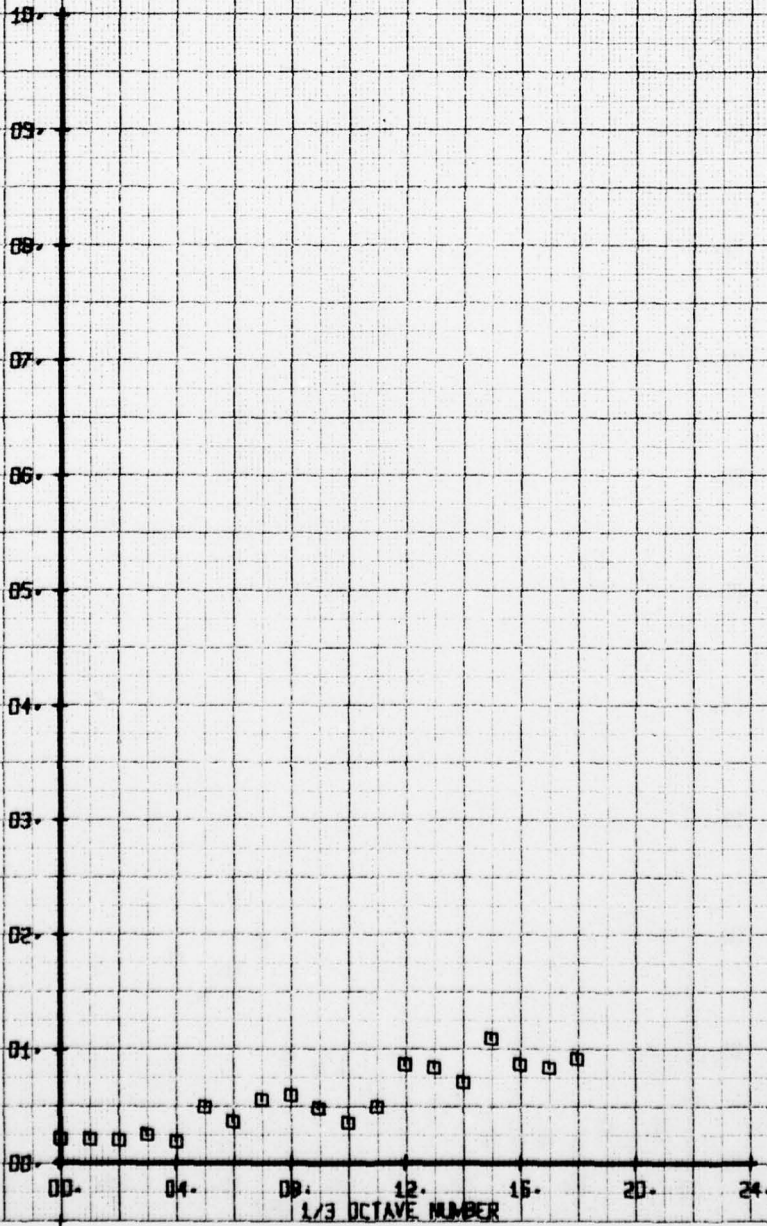
VELOCITY COMPONENT VEL-1RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/11-BLADES OFF, HUB OFF
RUN 159 TP 3

SYM CH PARAMETER
□ 74 VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



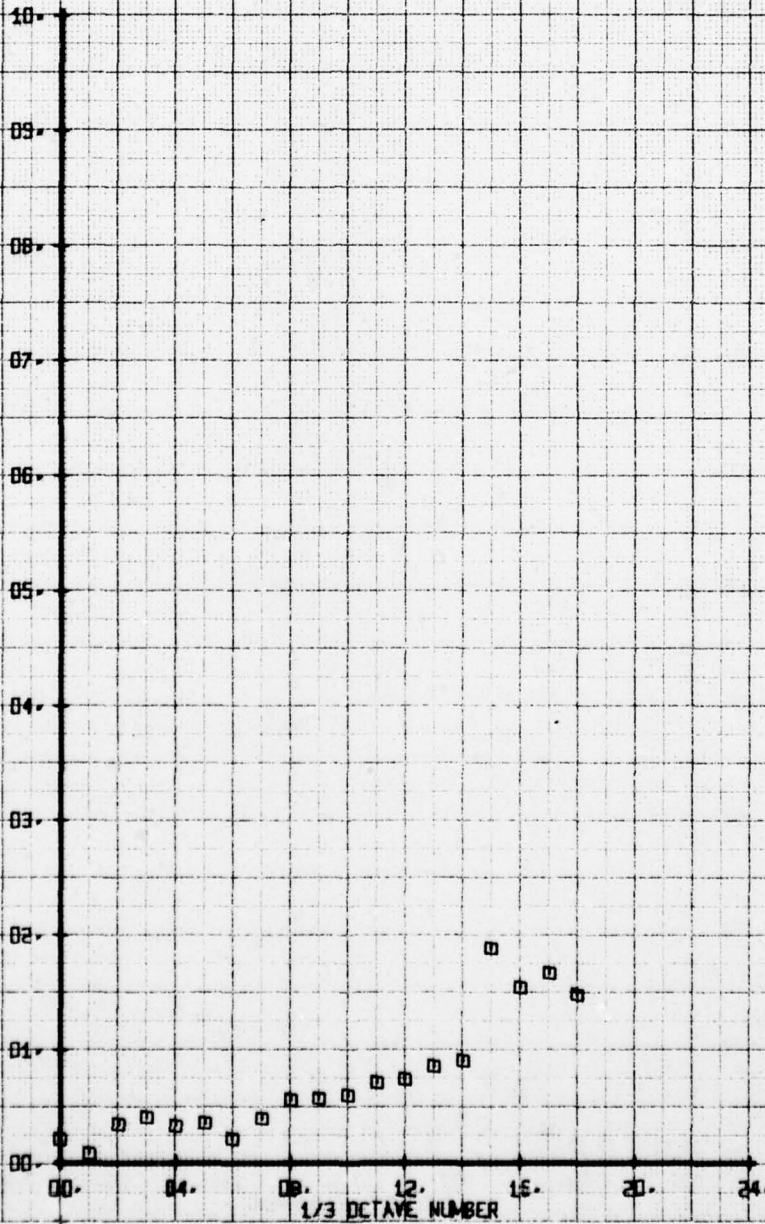
HOT FILM WARE 1/3 OCTAVE ANALYSIS
BASELINE 8/AI-BLADES OFF, HUB OFF
RUN 159 TP 4

SYM
□

CH
74

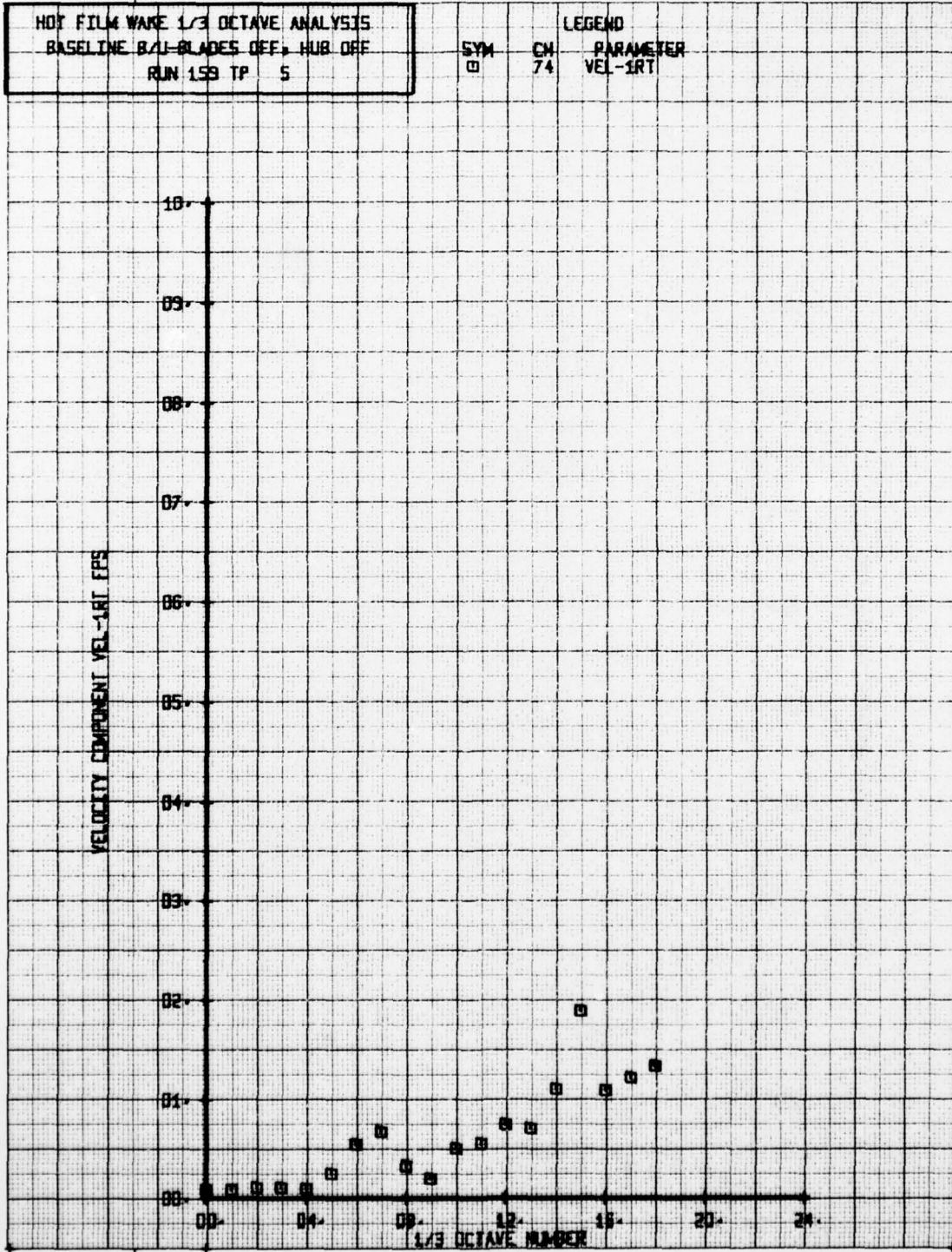
LEGEND
PARAMETER
VEL-1RT

VELOCITY COMPONENT VEL-1RT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, HUB OFF
 RUN 159 TP 5

SYM	CN	LEGEND
□	74	PARAMETER VEL-1RT



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INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)

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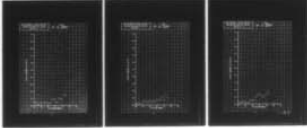
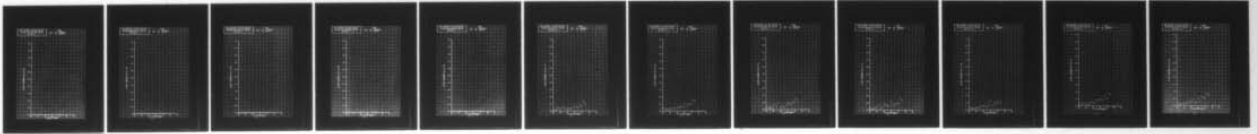
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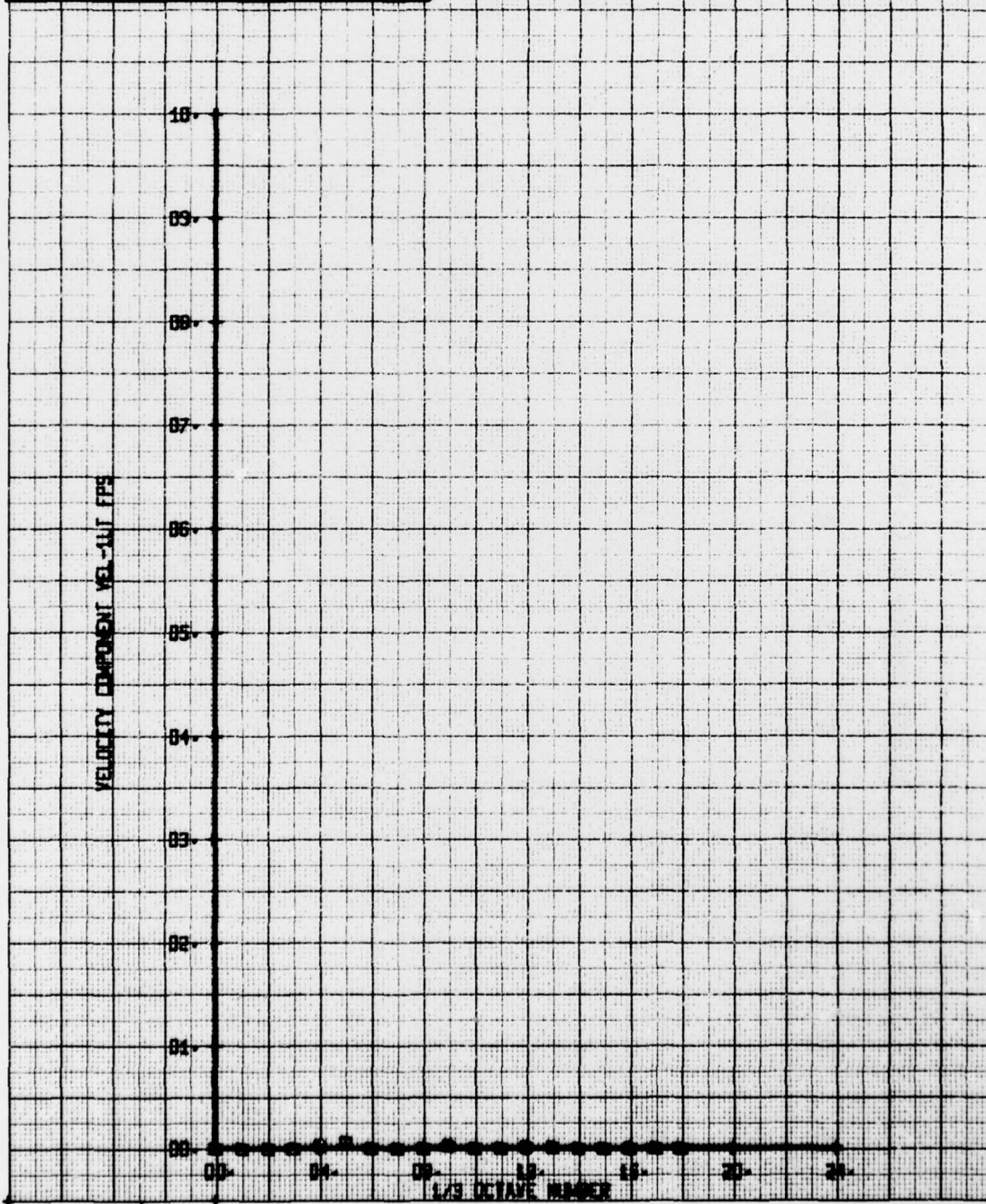
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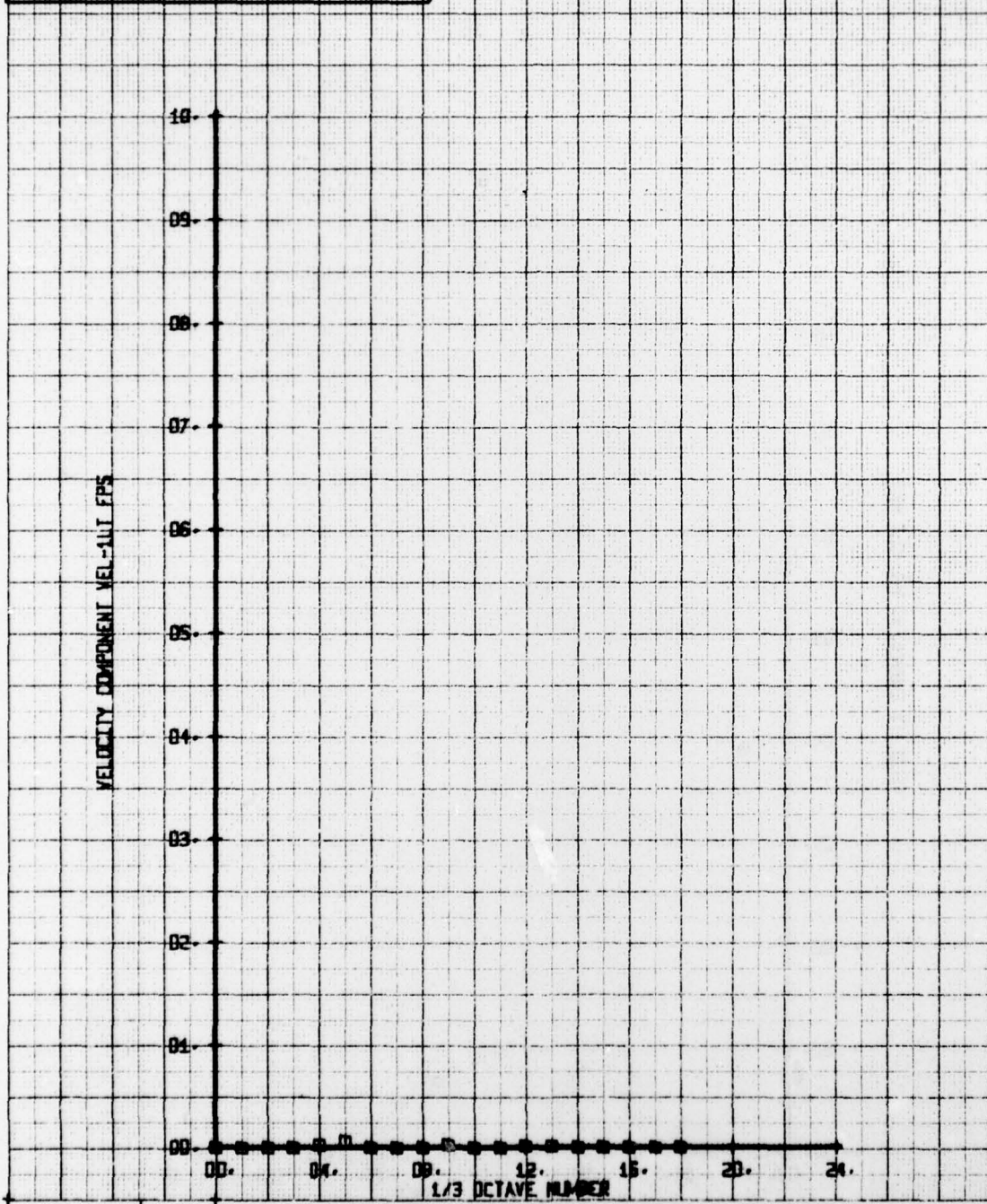
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE 8/1-BLADES OFF, HUB OFF
RUN 158 TP 1

SYN CH PARAMETER
0 73 VEL-1LT



HOT FILM WARE 1/3 OCTAVE ANALYSIS
BASELINE B/LI-BLADES OFF, HUB DRF
RUN 159 TP 2

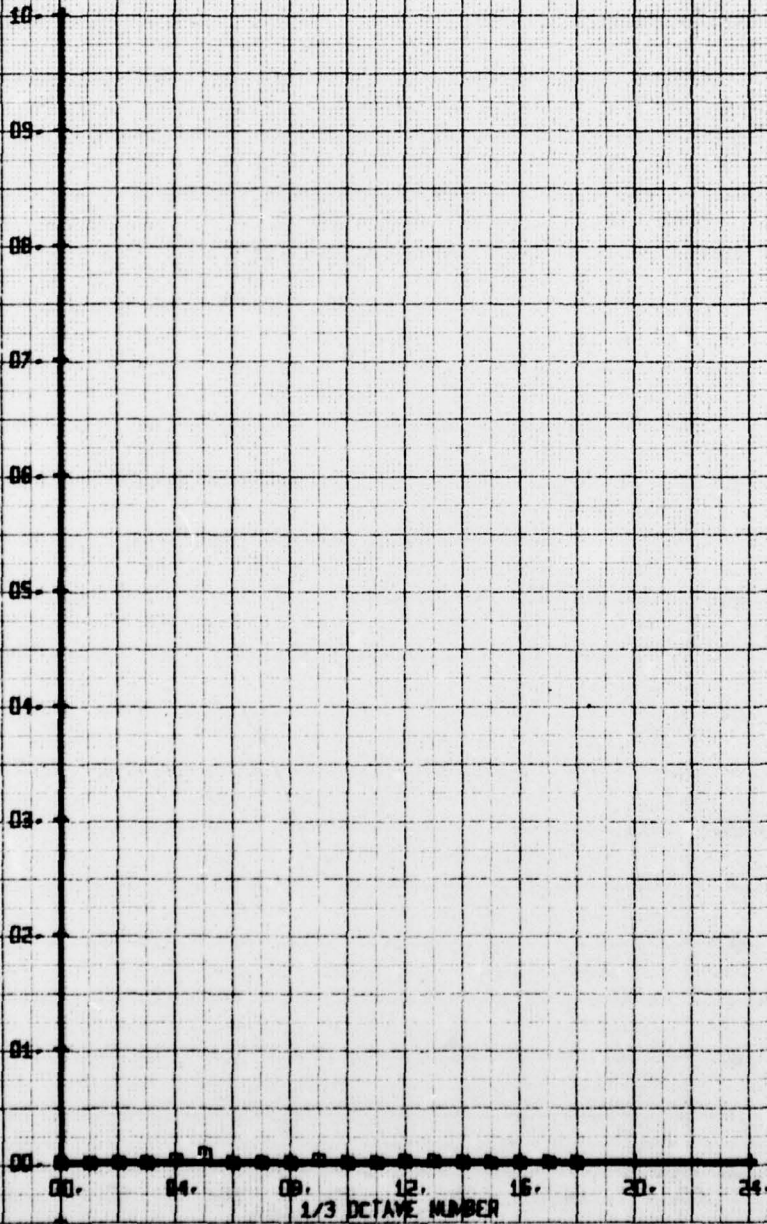
SYM	CH	PARAMETER
0	73	VEL-1LT



NET FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE 8/11-BLADES OFF, NUB OFF
RUN 159 TP 3

SYM	CH	PARAMETER
0	79	VEL-1LT

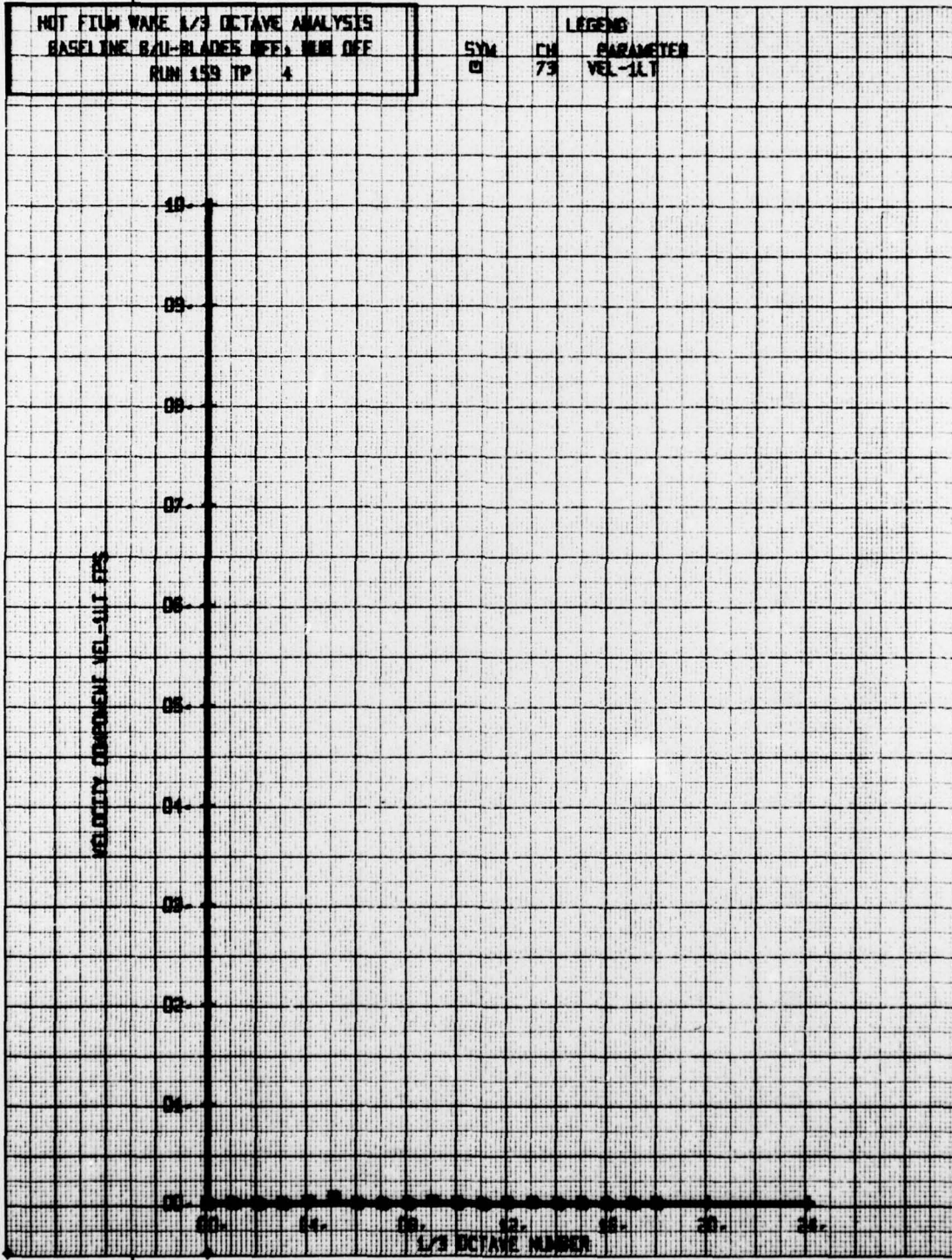
VELOCITY COMPONENT VEL-1LT EPS



NOT FILM WARE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, NUB OFF
RUN 159 TP 4

SYM	CH	PARAMETER
□	73	VEL-1LT

VELOCITY COMPONENT VEL-1LT FPS

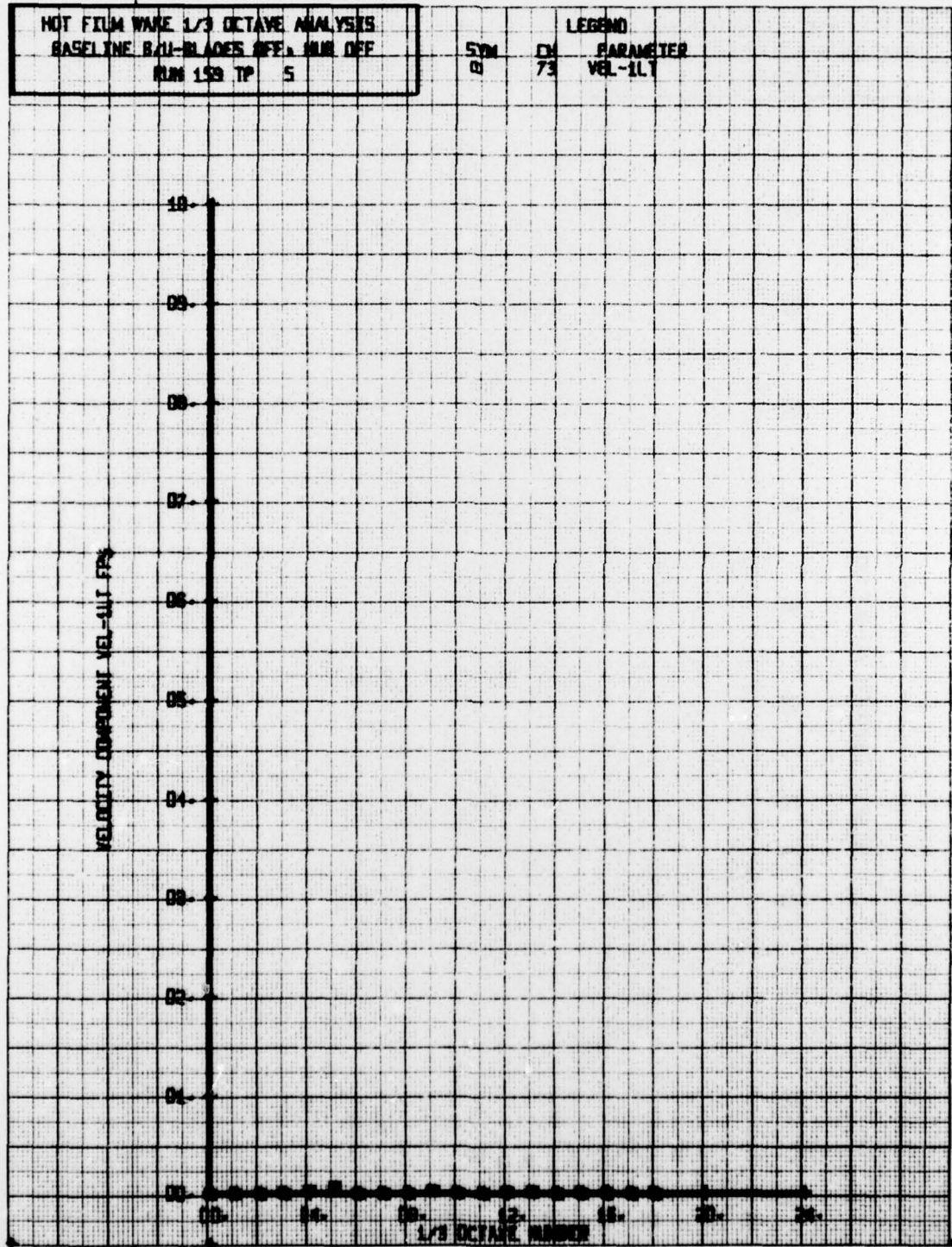


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B/U-BLADES OFF, WAKE OFF
RUN 159 TP 5

SYM
0

CH
73

LEGEND
PARAMETER
VEL-1L1

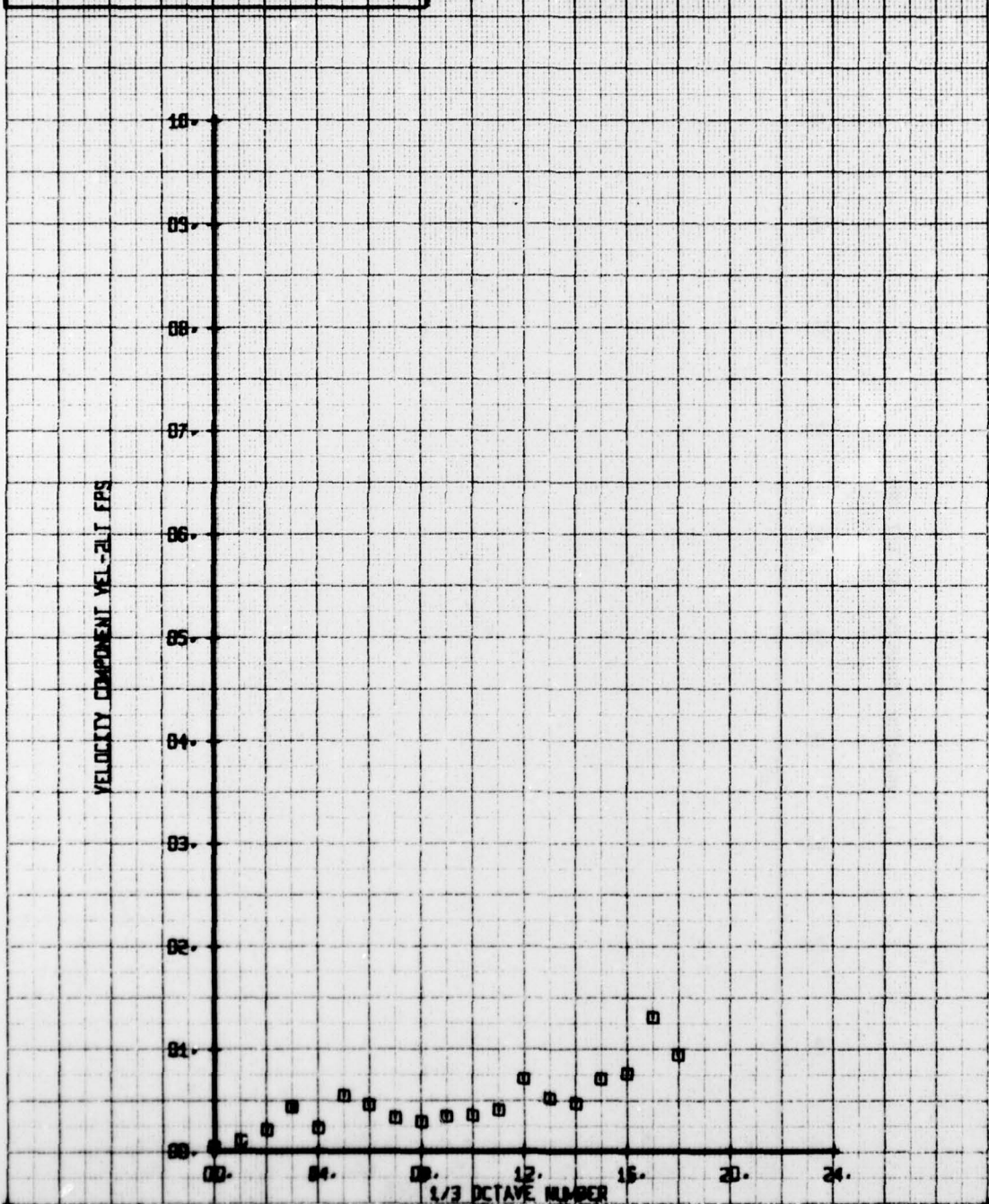


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
BASELINE 8/1-BLADES OFF, HUR OFF
RUN 199 TP 1

SYM
□

CH
72

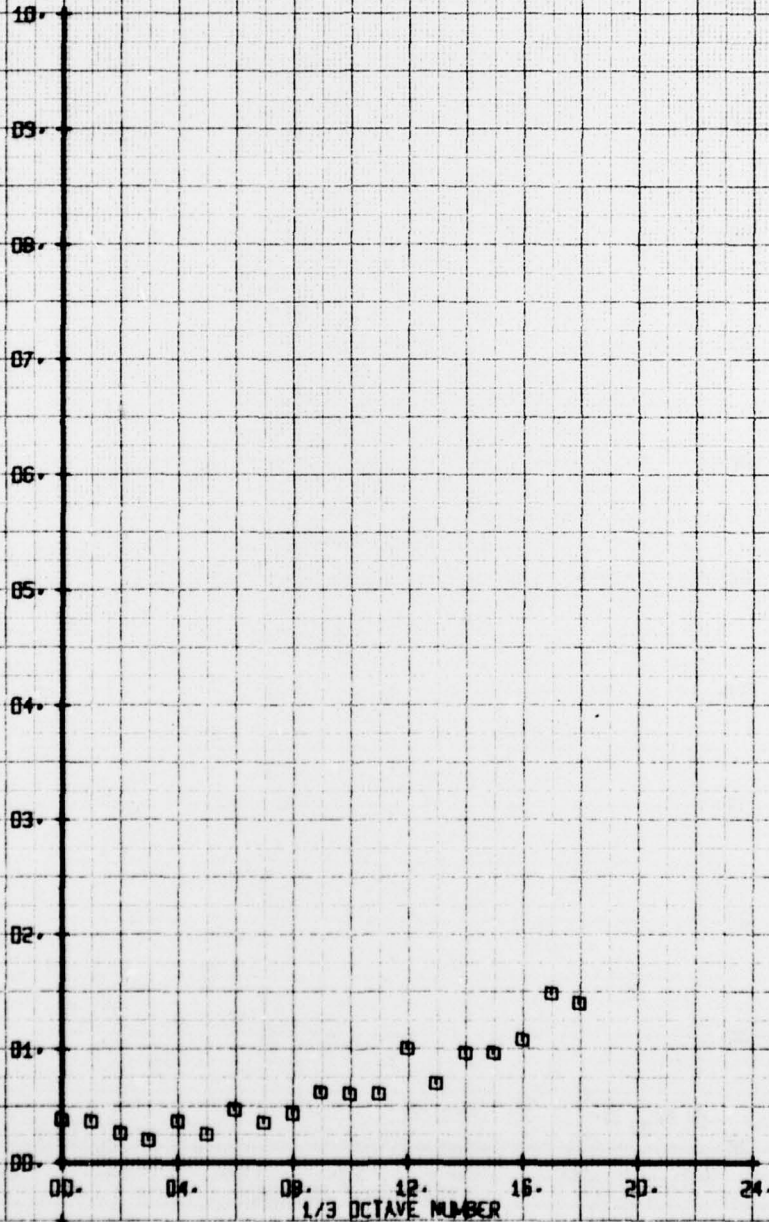
LEGEND
PARAMETER
VEL-ZLT



HDF FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE B-11-BLADES OFF, HUB OFF
RUN 159 TP 2

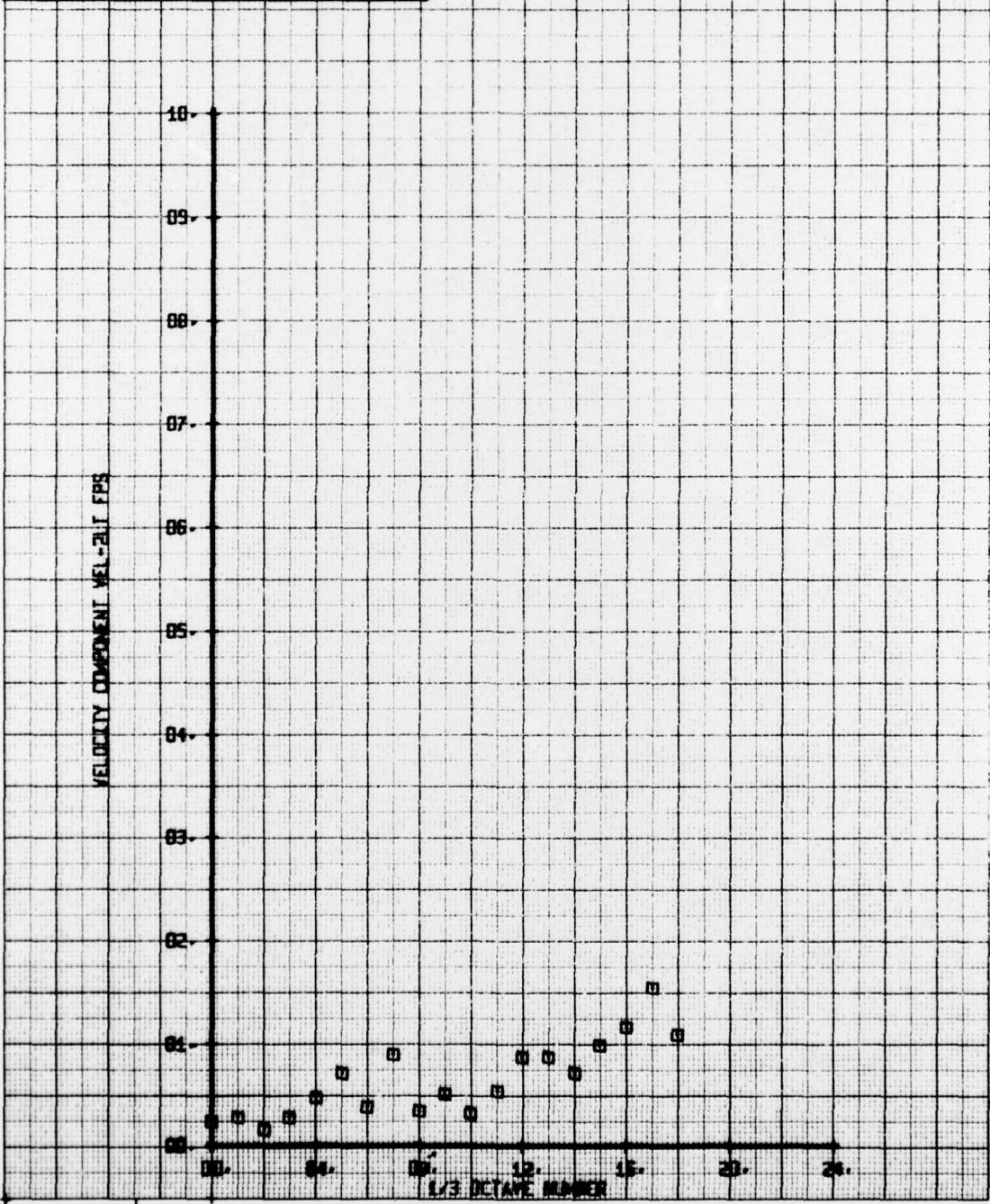
SYM	CH	PARAMETER
□	72	VEL-2LT

VELOCITY COMPONENT VEL-2LT FPS



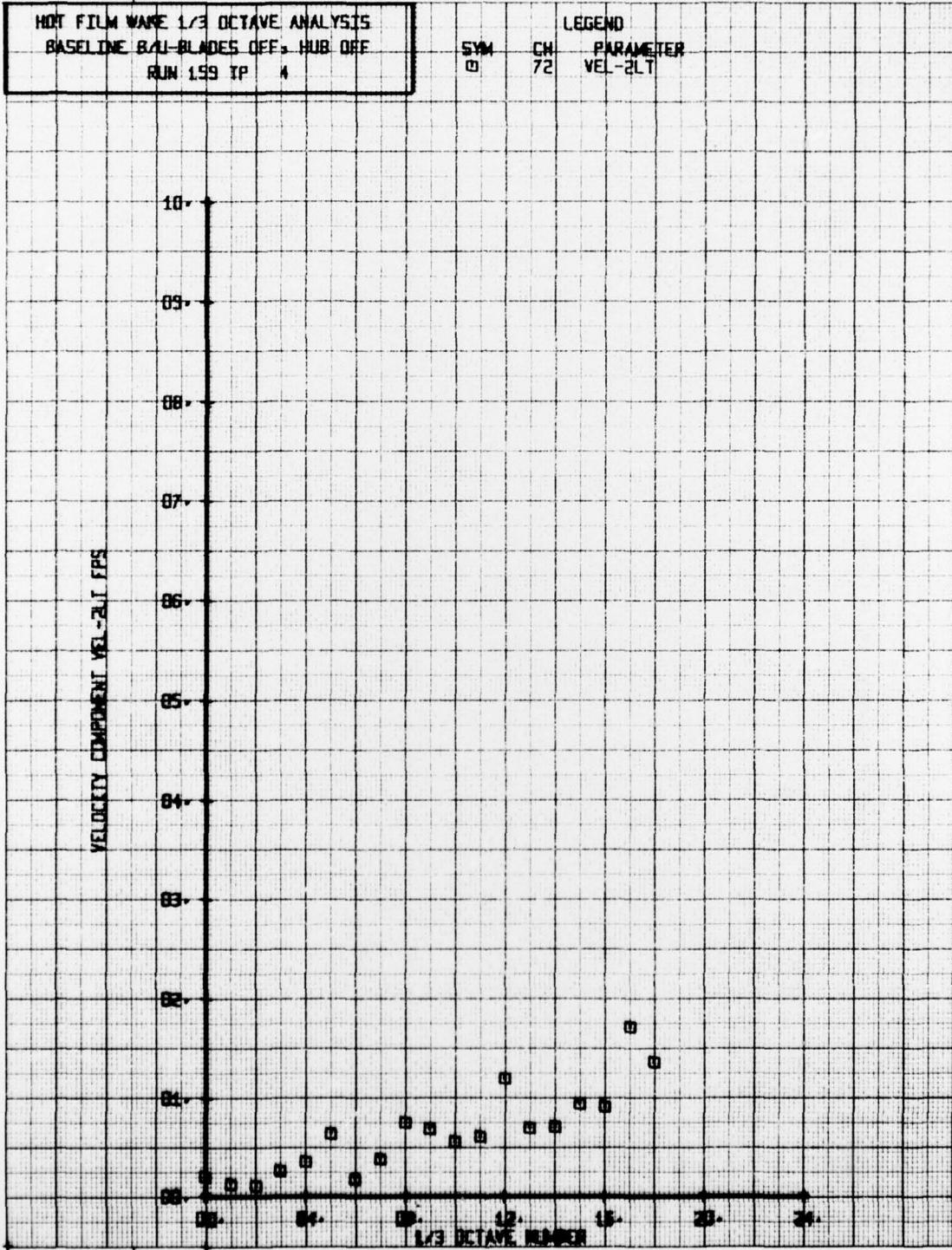
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE B/HI-BLADES OFF, HUB OFF
 RUN 159 TP 3

SYM	CH	PARAMETER
□	72	VEL-2LT



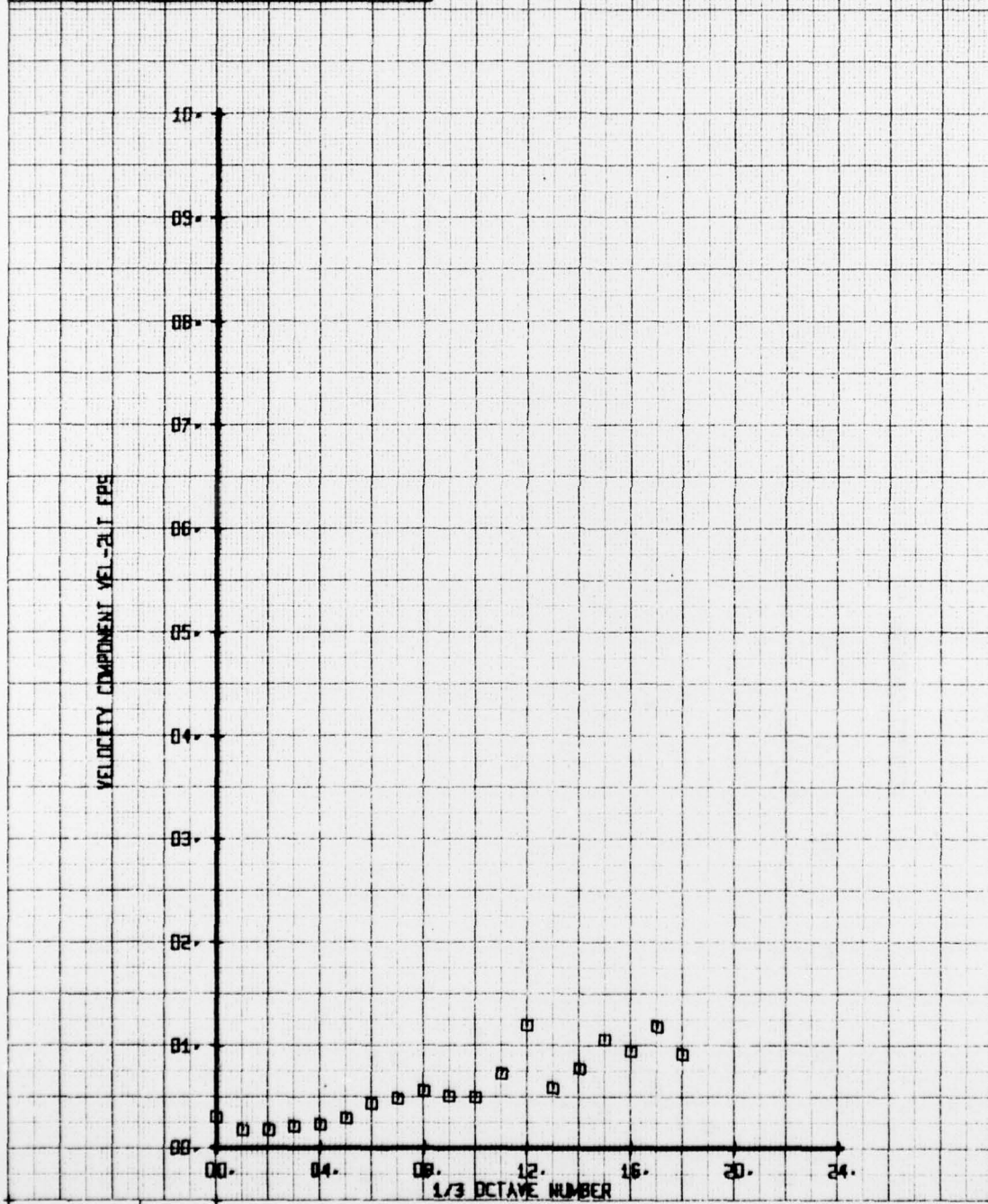
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11-BLADES OFF, HUB OFF
 RUN 159 TP 4

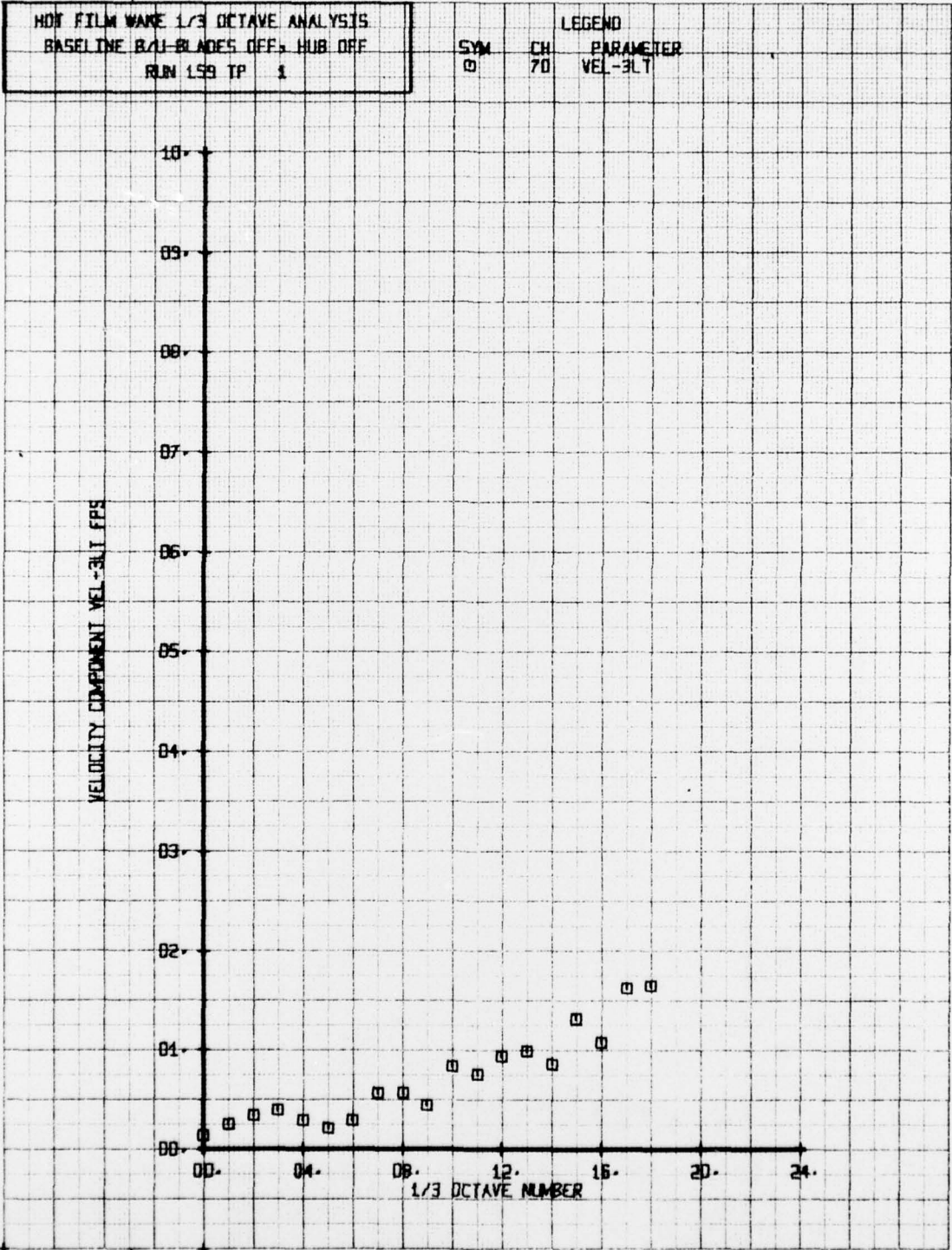
SYM	CH	PARAMETER
□	72	VEL-2LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE BLU-BLADES OFF, HUB OFF
RUN 199 TP 5

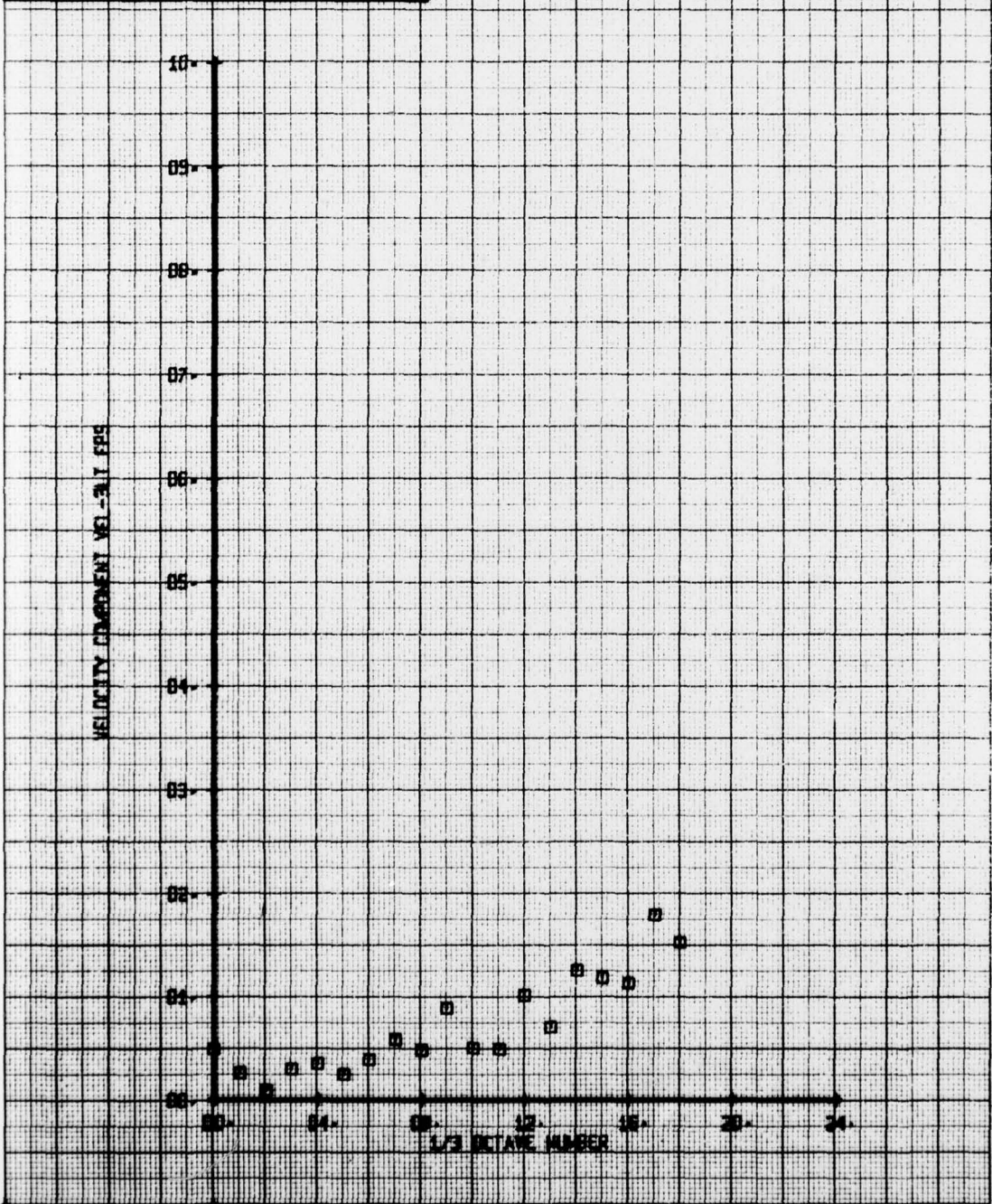
LEGEND
SYM CH PARAMETER
□ 72 VEL-2LT





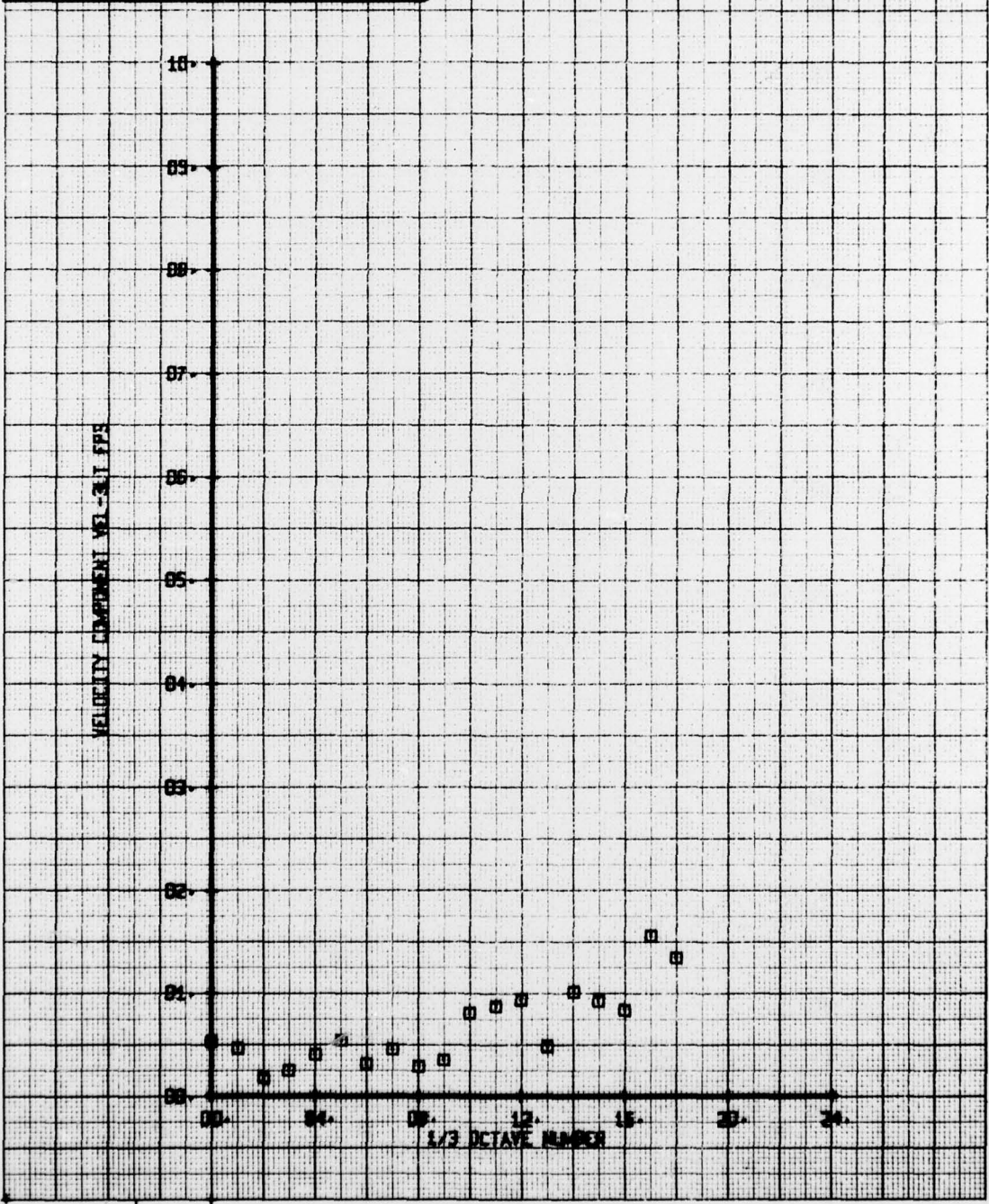
NOT FILM WARE 1/3 OCTAVE ANALYSIS
 BASELINE B/U-BLADES OFF, HUB OFF
 RUN 159 TP 2

SYM	CH	PARAMETER
□	70	VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE 8/11-BLADES OFF, HUB OFF
 RUN 159 IP 3

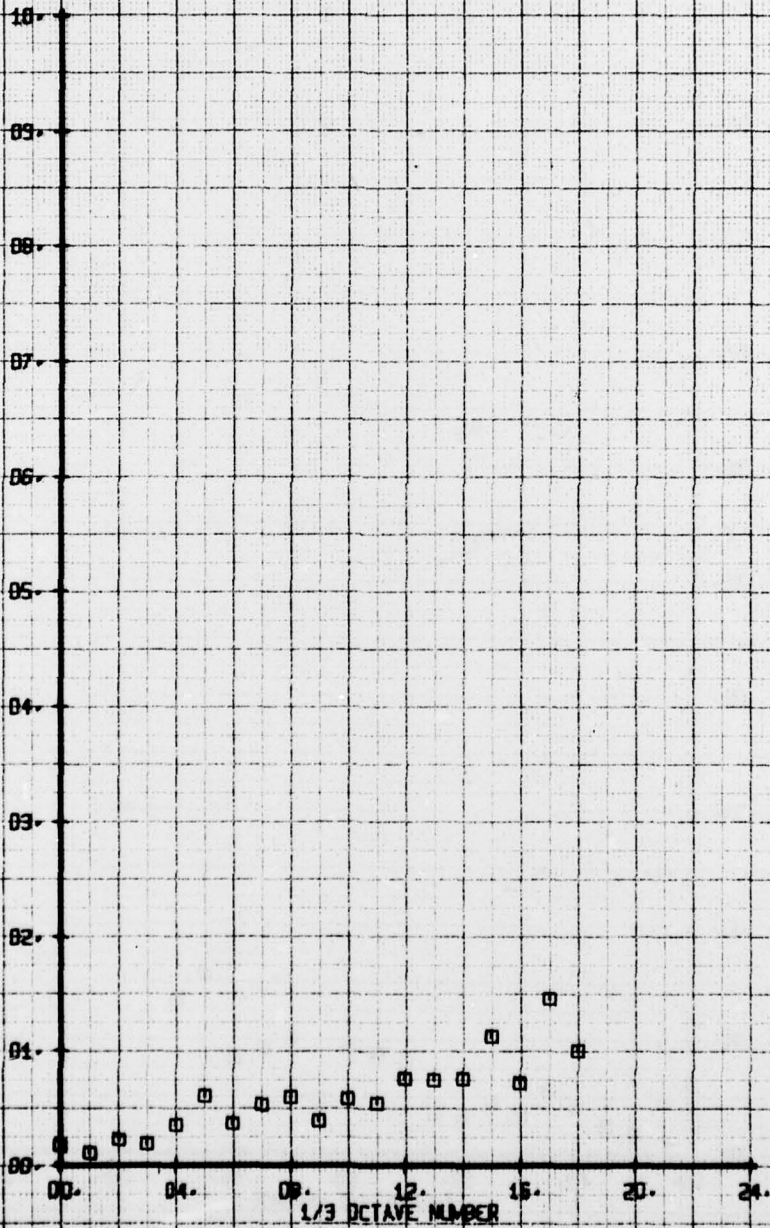
LEGEND	
SYM	CH
□	70
	PARAMETER
	VEL-3LT



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE BAL-BLADES OFF, HUB OFF
 RUN 159 TP 4

SYM	CH	PARAMETER
□	70	VEL-3LT

VELOCITY COMPONENT VEL-3LT FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE RAU-BLADES OFF, HUB OFF
 RUN 199 TP 5

SYN CH PARAMETER
 0 70 VEL-3LT

