

## **Body Composition & Anthropometrics**

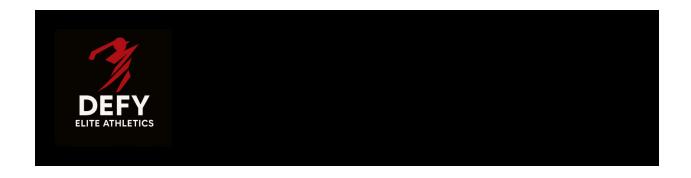
Metric	Formula	Notes
Body Mass Index (BMI)	weight (kg) ÷ [height (m)] <sup>2</sup>	Screening tool; doesn't distinguish muscle vs. fat
Waist-to-Hip Ratio (WHR)	waist (cm) ÷ hip (cm)	mass >0.90 (men) or >0.85 (women) indicates higher health risk
Skinfold (3-Site) Body	Men: BD = 1.10938 -	Sites (men): chest,
Fat %	0.0008267·ΣSF +	abdomen, thigh; (women):
	$0.0000016 \cdot (\Sigma SF)^2 -$	triceps, suprailiac, thigh;
	0.0002574·Age; %BF = (495 ÷ BD) - 450	use calipers (mm)

## **Cardiovascular Training Calculations**

Calculation	Formula	Example (age 30, resting
		60 bpm)
Max HR (Fox)	220 – age	190 bpm
Max HR (Tanaka)	208 – (0.7 × age)	≈187 bpm
Heart Rate Reserve (HRR)	HRmax – HRrest	130 bpm
Target HR (Karvonen)	HRrest + (Intensity% ×	138 bpm at 60%
	HRR)	
VO₂max (Cooper Test)	(Distance(m) - 504.9) ÷	$42.2 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$
	44.73	

## **Heart Rate Training Zones**

Zone	%HRR	Purpose
Recovery	30-39%	Active recovery, warm-up
Light	40-49%	Health, recovery
Moderate	50-59%	Aerobic base, fat burn
Hard	60-79%	Endurance, performance
		gain
Very Hard	80-89%	Anaerobic threshold
		training



### **Strength Assessment & Training Load**

Calculation	Formula	Notes
1RM (Epley)	weight $\times$ (1 + reps $\div$ 30)	Best for ≤10 reps
1RM (Brzycki)	weight ÷ (1.0278 –	
	0.0278×reps)	
<b>Volume Load</b>	sets × reps × weight	Total work per session
Intensity Zones (1RM%)	<67% Endurance; 67–85%	Guide rep ranges
	Hypertrophy; >85%	
	Strength	

#### **1RM Prediction Formulas**

Formula	Equation	Use Case
Lombardi	weight × reps^0.10	High-rep estimates
Mayhew	(100×weight) ÷ (52.2 +	Alternative for varied reps
	41.9e^(-0.055×reps))	

## **Program Design Guidelines (FITT & Periodization)**

Principle	Details	
Frequency	2-3d/wk novice; 4-6d/wk	
	intermediate/advanced	
Intensity	See HR Training Zones	
Time	Resistance: 30–60min; Aerobic: 20–60min	
Туре	Multi-joint first, then single-joint; combine	
	cardio & strength	

## **Exercise Prescription Tables**

Goal	Rep Range	%1RM	Rest Interval
Strength	1-5	85-100%	2-5min
Hypertrophy	6–12	67-85%	30-90s
Endurance	12-20+	<67%	<30s
Power	1–5	30-60% explosive	2-5min



# Flexibility & Mobility Protocols

Type of Stretching	Description	When to Use
Dynamic	Active movements through full ROM	Pre-session warm-up
Static PNF (Contract-Relax)	Passive hold 15–60s Contract → relax → deepen	Post-session cool-down Flexibility sessions
	stretch	

## **Session Structure Template**

Time (min)	Segment	Tips
5-10	General Warm-Up	Light cardio; cue quality
5-10	Dynamic Mobility	Leg swings, arm circles
5	Activation	Glute bridges, banded steps
20-40	Resistance Training	Follow order; track volume
5-10	Accessory & Core	Target weak points
5-10	Cool-Down & Stretch	Static stretches; foam roll
2	Review & Homework	Recap; assign plan

Conversion	Factor
$1 \text{ kg} \rightarrow \text{lb}$	×2.2046
$1 \text{ lb} \rightarrow \text{kg}$	÷2.2046
$1 \text{ in} \rightarrow \text{cm}$	×2.54
$1 \text{ cm} \rightarrow \text{in}$	÷2.54

**Unit Conversions**