Characteristics of HEXS

- HEXS physical size is 30cm x 30cm x 15cm.
- HEXS weighs about 20 kg.
- HEXS can fit on any port larger than 3 cm diameter.
- HEXS covers the energy range of 100 eV to over 3600 eV.
- Using K, L, and M lines, HEXS can efficiently detect all elements from Be to Plutonium.
- HEXS and its electronics consist of the spectrometer on the SEM and a computer.

- HEXS runs under Windows.
- **HEXS has an automatic gate valve to allow the spectrometer to be isolated from the SEM.**
- **HEXS performs quantitative analysis**

Choice of Diffractors

Most users would probably prefer to never have to deal with choosing diffractors so the HEXS spectrometer operates in an Energy mode never mentioning wavelength unless the user desires it. However, a proper choice of diffractors selected for the users needs can be very helpful. The normal selection of diffractors is as follows:

Mo/B4C 2d = 160	For very low energy lines such as Be and B
Cr/Sc 2d = 80	For C and N
W/Si 2d = 60	For energies between 500 and 1000 eV
2d = 30	For energies between 500 and 2000 eV
PET 2d = 8.79	For energies between 1700 and 2400 eV
2d < 8	For higher energy
Alternate choices:	
2d = 120	Specifically for C. This diffractor has limited use other than C but gives the 5750 cps/na that we quote. Unless you really want C sensitivity, we do not recommend it because you will have to give up sensitivity to other elements and the standard diffractor (2d = 80) works reasonably well for C.

Cr/Ti 2d=80	Specifically for the Ti (L_α) line and it suppresses the N line.

Measured HExS Performance

Element	Energy(eV)	Counts/sec/na	P/B	Resolution (eV)	Sensitivity(ppm)
Be 10KV	108	400	40	10	100
B 10KV	183	6000	100	18	<20
*C 10KV	277	5750	>100	18.6	14
N(BN) 10KV	392	416	40	16	130
O(SiO_2)	525	375	80	17	60
Mg 10KV	1254	600	400	14	18
Al 10KV	1487	500	300	19	25
Si 25KV	1740	600	500	5	15

* With 2d=120. Normal diffractor is 2d=80 giving 1000 cps/na, P/B > 50, 14 eV resolution.